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The World-Wide Effort

TO

Diminish Infant Mortality

Its Present Status and Its Possibilities

EDWARD BUNNELL PHELPS

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THE WORLD-WIDE EFFORT TO DIMINISH INFANT MORTALITY—ITS PRESENT STATUS AND ITS POSSIBILITIES

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Annex

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THE WORLD-WIDE EFFORT TO DIMINISH INFANT MORTALITY—ITS PRESENT STATUS AND ITS POSSIBILITIES

Thoughtful people throughout the civilized world are at last awakening to a realization of the intimate and inseparable relation of infant mortality with human welfare and progress, and, thus awakened, are beginning to sense the grave importance of checking the present appalling waste of human life. Varying only in detail and relative importance, the problem confronts all inhabited lands; and obviously its dimensions are world wide.

A world problem though it is, up to very recent years the workers in this field naturally have concentrated the bulk of their attention on the facts and figures of their respective countries, municipalities, or districts, according as their endeavors on these lines were national or purely local in scope. A few demographers have made use of all available official statistics and from time to time tabulated international comparisons of birth rates and infant death rates. But, in so far as I have observed, up to date no one has made any serious attempt to measure infant mortality as a world-wide problem and thus supply even the merest approximation of the probable number and rate of infant deaths in the world at large. In default of such information, even though almost one-half of the world's population as yet makes practically no pretense of compiling its vital statistics, it may not come amiss at the outset of this inquiry regarding "The world-wide effort to diminish infant mortality," to venture into this unex-

plored field, apply to its several sections such adjusted estimates as the known figures for fairly comparable sections would seem to warrant, and thus endeavor to work out a tentative approximation of the present status of infant mortality as a world problem. With such an approximation available, we shall have at least a prefatory glimpse of the magnitude of the problem which confronts us.

AN APPROXIMATION OF THE INFANT MORTALITY OF THE WORLD AT LARGE

There is, of course, a wealth of international statistical compilations available as a basis for such a computation, but the current issue (No. 5) of the Official Year Book of the Commonwealth of Australia, that remarkable work of G. H. Knibbs, the Commonwealth Statistician, bearing date of June 25, 1912, presents figures for the world's population in the main compiled from the Statesman's Year-Book for 1911, and offers the very latest reliable international vital statistics now available. Mr. Knibbs fixes the world's total population at 1,722,322,136, and, making allowances for the natural increase since the figures presented in Sundbärg's *Aperçus Statistiques Internationaux* (1908 edition) and Webb's *New Dictionary of Statistics* were compiled, the total presented in the Official Year Book of the Commonwealth of Australia bears every evidence of approximate accuracy. Making his estimate on the basis of the figures in the editions of the *République Française*; *Annuaire statistique* for 1905-1907, Webb puts the world's population at 1,610,000,000, and Sundbärg in 1908 made it 1,647,533,770.

Mr. Knibbs's estimate being the latest available and apparently entitled to full credence, I have taken his figures as the basis for the following tabulation of populations, in even millions, and from the latest birth and infant death rates which his work and the Statesman's Year-Book for 1912 present I have worked out the appended figures for the several sections, with the exception of those for India and China. My figures for India are based on the official Report on Sanitary Measures in India in 1909-10 (Vol. XLIII), published in 1911, and those for China on certain specific figures presented in Prof. Edward Alsworth Ross's very recent work, *The Changing Chinese* (1912), as checked up and modified in the light of various other credible sources of Chinese information which I have consulted and the official vital statistics for the near-by city of Manila for the last

nine years. Thus computed, the number and rate of births and infant deaths now annually occurring in the world at large and their broad geographical distribution would seem to be approximately as follows:

Sections of the world	Population	Living births		Deaths under 1 year	
		Rate per 1,000 of population	Number	Rate per 1,000 births	Number
Russia in Europe (and its European possessions)	136,000,000	48	6,528,000	250	1,632,000
Balance of Europe.....	312,000,000	29	9,048,000	140	1,266,720
Australasia and Polynesia.....	7,000,000	26	182,000	70	12,740
India	315,000,000	36	11,340,000	240	2,721,600
China (and its dependencies)...	434,000,000	50	21,700,000	400	8,680,000
Balance of Asia.....	209,000,000	35	7,315,000	200	1,463,900
Africa	133,000,000	35	4,655,000	200	931,000
America (all parts).....	176,000,000	30	5,280,000	150	792,000
Total	1,722,000,000	38	66,048,000	265	17,499,060

The above population estimates are probably entirely dependable, with the possible exception of that for China and its dependencies, the population of China having been stated in the returns of the second National Census published by the Chinese Government on February 27, 1911, as 310,168,305, as contrasted with the estimate of 407,253,030 for China proper given in the Statesman's Year-Book for 1912. There are other reasons for believing that the supposed population of China, generally fixed at approximately 400,000,000, may have been decidedly overestimated, but even were a deduction of a round 100,000,000 from the world's supposed total population made on this account the annual totals of living births and infant deaths would still stand at 61,048,000 and 15,499,060, respectively, and the world's average birth rate and infant death rate at 37.6 and 254, respectively, as compared with the averages of 38 and 265, shown by the preceding tabulation.

On the strength of his personal observations and inquiries Prof. Ross fixes the Chinese birth rate at from 50 to 60 per 1,000 of population, on page 110 of his work previously named referring to "the present fecundity of 50 to 60 per 1,000—three times that of the American stock and nowhere matched in the white man's world, unless it be in certain districts in Russia and certain parishes in French Canada." He also says (p. 103):

Dr. McCartney, of Chungking, after 20 years of practice there, estimates that 75 to 85 per cent of the children born in that region die before the end of the second year. The returns from Hongkong for 1909 show that the number of children dying under 1 year of age is 87 per cent of the number of births reported within the year. The first census of the Japanese in Formosa seems to show that nearly half of the children born to the Chinese there die within six months.

In the London *Lancet* and other publications I have found confirmation of these figures for the Chinese population in Hongkong and Formosa. By tabulating the official vital statistics of the Philippine capital for the last nine years (1903-1911) I find that the apparent infant mortality rate in Manila (and presumably, officials say, in the Philippines at large) was 552 per 1,000 births—and as high as 477 for the last five years despite the improved registration of births—and even the incomplete birth returns show a birth rate of 41.4 per 1,000 population for Manila in 1910. It would therefore seem, in view of all the direct evidence regarding China and the collateral official evidence concerning near-by Formosa and Manila, that the assumption of a birth rate of 50 and an infant death rate of 400 per 1,000 births for China is well within conservative limits and very probably below the actual figures in each case.

In the case of India, both the birth and infant death rate figures which I have employed are below the actual registration figures for about three-quarters of the total estimated population of India, the mean birth rate for the last quinquennial period having been 38.64, and the infant death rate for 1909 having been, on the average for both sexes, 243.6 per 1,000 births, whereas I have fixed these figures at only 36 and 240, respectively. For the remainder of Asia, and for Africa as a whole, I have assumed an average birth rate of 35 per 1,000, and an infant death rate of but 200, and for North, South, and Central America average rates of only 30 and 150; and I venture to believe that anyone provided with even the most superficial information regarding the vital statistics of these sections will concede that all of these assumptions are extremely conservative. It would consequently seem entirely safe to say that, in round numbers, at least 60,000,000 births annually occur in the world at large, and that the world's infant mortality each year amounts to 15,000,000 at the lowest possible estimate. In other words, presumably more than 40,000 babies' deaths occur each day in the year, practically one for every other second of time. Or, to put it graphically, one infant dies every other time the clock ticks. Including the heavy colored-infant

mortality of the South, the United States probably contributes almost if not quite 1,000 of the world's total of 40,000 infant deaths per diem, and there are the best reasons for believing that 50 per cent of the world's 40,000 infant deaths a day, year in and year out, are unquestionably preventable. In brief, the needless annual waste now foots up at least 7,500,000 infant lives.

THE FIRST STATUTORY MOVES FOR ITS REDUCTION

In one sense special protection for helpless infancy is as old as civilization—and in the broadest sense as old as the human race—but deliberately planned and broadly executed governmental measures for preventing the appalling, needless, waste of infant life, which has only latterly been demonstrated, are practically restricted to the present generation, and in the main are but events of yesterday. To be sure, the spasmodic public discussion of the luckless lot of babies "put out to nurse" at least dates back to the production of Dickens's *Oliver Twist*, in 1830, or more than 80 years ago. But, as Miss Frances Zanetti, an inspector at Manchester, England, noted at the recent Third International Congress for Infant Protection, at Berlin, in her contribution to the discussion of foster children and illegitimate children, the first infant-life protection act of Great Britain did not become the law of the land until 1872. As Miss Zanetti put it:

The movement for the protection of children nursed for hire probably owes its inception to Charles Dickens, whose powerful novel, *Oliver Twist*, with its graphic descriptions of the sufferings of the unfortunate "juvenile offenders under the poor laws, farmed out at the rate of 7½ d. per small head per week," brought vividly home to his readers all the trials and injustices inflicted upon these children by those misnamed "guardians of the poor," who failed so lamentably in their trust. Yet, though it is said that a wave of horror swept over England when *Oliver Twist* was published, and though undoubtedly the book struck the death blow to "Bumbledom," the plea for the better protection of children nursed for hire bore no result for more than 40 years.

Although the famous *Loi Roussel*, of France, was not enacted until 1874, or two years after the English infant-life protection act, as early as 1835 Brodart, at Tours, urgently called for the regulation of the "nursing industry." In 1862 the summary of an investigation published by the minister of the interior revealed an infant mortality of 73.43 per 100 births in nine departments. Four years later, Dr. Brochart published a paper, awarded a prize by the Academy of Sciences, in which he showed that, without including those assisted, 100,000 babies

died in France each year of hunger, misery, and the lack of the necessary care and attention. In 1867 the Academy of Medicine appointed an infancy commission, in 1869 instituted a mixed commission under the presidency of M. de Royer, president of the *Cours des Comptes*, and on April 12, 1870, made the Commission on the Hygiene of Infancy a permanent one. The war, of course, temporarily interrupted the academy's work on these lines, but on November 28, 1871, the commission presented its preliminary report in which it discussed the causes of infant mortality and means of combating them; in 1873 was allotted 2,000 francs by the minister of the interior for the purchase of medals for the principal essayists who had contributed to the extensive discussion of the subject, the publication of their papers, etc.; and, finally, in 1874 the measure introduced in 1873 by Dr. Théophile Roussel, the well-known deputy, was enacted, and was promulgated on January 8, 1875. Such was the evolution of the famous statute, which, in recognition of the service rendered by its author, was designated the "Loi Roussel."

Like the English infant-life protection act of two years before, the French law was powerless except in the case of infants farmed out, but within the limitations of that field was much more comprehensive and effective. The infant-life protection act was not the final outcome of a prolonged medical and governmental, or semigovernmental, investigation of infant mortality and its causes, as was the French law, but was the immediate result of the wave of horror which swept over England at the discovery that the deaths of a number of infants whose bodies were found in the streets of London were due to a woman named Margaret Waters, who was arrested, tried, convicted, and hung for her wholesale crime. A select committee was promptly appointed "to inquire as to the best means of preventing the destruction of the lives of infants put out to nurse for hire by their parents," and the crude law adopted in 1872 was thus born, applying only to infants under 1 year of age and prohibiting the maintenance of more than one such child for more than 24 hours away from its parents except in a house registered for the purpose. The French law, on the other hand, was operative in the case of all children under 2 years of age who might be put out to nurse or cared for, made them the special care of the State, and contained elaborate provisions for the registration, inspection, and supervision of all places in which children under 2 years of age might be so kept. The English law was of slightly earlier date,

but the *Loi Roussel* was practically the pioneer in its line, and doubtless served as the model for most of the legislation on these lines subsequently adopted in other countries.

FRANCE THE PIONEER IN THE MOVEMENT

Not only in legislation but in various other steps for infant welfare, France is conceded by common consent to have blazed the way for the present, almost world-wide, crusade for the reduction of infant mortality. It was in France that the *Société de Charité Maternelle* was founded in 1786, even prior to the Revolution, by Madame de Fougere, for the relief of poor married women at the time of confinement, and in 1910 was credited with having aided about 30,000 mothers. At Paris, too, the "*Association des Mères de Famille*" was established as early as 1836, has as many sections as there are *arrondissements*, and with a liberal hand deals out varied forms of aid and relief to indigent mothers. The day-nursery movement, which now reaches out to practically every corner of the civilized world, was founded, with probably never a thought of its ultimate evolution, by M. Firmin Marbeau, when he established the pioneer *crèche* at Paris on November 14, 1844. In 1893, Dr. Variot, one of the pioneers in the child-welfare movement, started a "*Distribution de Lait au Dispensaire de Belleville*" in Paris, thus paving the way for the first "*Goutte de Lait*" opened under that name in 1894 by Dr. Dufour of Fécamp; that present adjunct of babies' milk stations, the "*Consultation de Nourrissons*" made its advent in 1892 at the Charité Hospital, and later on developed at the *Maternité* and the *Clinique Tarnier*, in Paris, and is accredited to that great leader in the battle against infant mortality, Dr. Pierre Budin. At the "*Pouponnières*," indigent mothers are received without charge on their discharge from the hospitals after convalescing from their confinement, on the single condition that they will nurse their own babies, and, in each case, the baby of some other mother whose employment makes it impossible for her to nurse her own; and these institutions also date back about 20 years, the original "*Pouponnière*" at Porchefontaine, near Versailles, having been created by the "*Société Maternelle Parisienne*" under the direction of Pasteur and Dr. Bergeron.

A great variety of other institutions for the care of pregnant women, women in confinement, and needy mothers with newly-born

charges, have been established in Paris in the last half century or so, and the first great national organization for the protection of infant life came into being in the French capital in 1902, when the "Ligue Française contre la Mortalité Infantile" was established by that illustrious trio of child-welfare pioneers, M. Roussel, the father of the Loi Roussel, Dr. Budin, and Senator Paul Strauss. The "Ligue Nationale Belge pour la Protection de l'Enfance du Premier Âge" was founded at Brussels in the following year, and in 1905 at the suggestion of Drs. Variot and Dufour the First International Congress de Gouttes des Lait was convened at Paris. At the second congress, held at Brussels in September, 1907, it was decided to broaden the scope of the international organization by changing its name to the "Congrès pour la Protection de l'Enfance du premier Âge," with its original title, "Gouttes de Lait," preserved in parenthesis, by way of permanent acknowledgement of the movement's indebtedness to the leadership of France, and in 1911 the third Congress convened at Berlin.

A notable feature of the Third International Congress for the Protection of Infant Life was the preparation and presentation to the delegates of an impressive résumé of the general plan and details of the child-welfare movement in greater Berlin under the direction of the management of the Kaiserin Auguste Victoria House for the Combating of Infant Mortality in the German Empire, the headquarters of the work on these lines in the Empire which is described at some length on subsequent pages of this paper. In addition to the descriptive matter, and directions for visiting the child-welfare institutions of Berlin, the souvenir work in question also contained an admirable view of the Development and Organization of the Movement for the Protection of Infants, prepared by Geheime Obermedizinalrat Professor Dr. Dietrich, of the Imperial Home Office and president of the International Association for the Protection of Infant Life, on which the writer of this paper has freely drawn for much of the detail of the preceding summary of the movement. The contents of the souvenir volume were printed in three languages for the convenience of the delegates from German, French, and English speaking countries, and the work constituted a book of 460 pages, effectively illustrated and bound. In his introductory paragraph, Dr. Dietrich thus authoritatively acknowledges the debt which the infant-welfare movement owes to France:

From time immemorial efforts have been made among cultivated nations to introduce special welfare work for children during their first year of age. But these efforts were without system and were only isolated. The first important attempts at systematic welfare work for babies took place toward the end of the last century in France where the great decrease in births and the decrease in the surplus of births over deaths had for a long time caused national biologists great anxiety.

At the session of the First International Congress of Gouttes de Lait at Paris, in October, 1905, Dr. Eugène Lust, of Brussels, suggested the organization of an international union "which would establish a permanent and international point of connection between all interested in child welfare throughout the world, so as to perpetuate progressively the institution of the Congresses of the Gouttes de Lait." The suggestion was heartily approved by the congress, an organization committee was appointed, and at the Second International Congress of Gouttes de Lait, held at Brussels in September, 1907, the constitution and rules recommended by the organization committee were adopted and the Union Internationale pour la Protection de l'Enfance du Premier Âge (The International Union for the Protection of Infancy) was formally established.

The mayor of Huddersfield, England, the chairman of the health committee of Glasgow, and other British visitors had attended the First International Congress of Gouttes de Lait, at Paris, in 1905, and were so deeply impressed with the movement that on their return, at their instance, a National Conference on Infant Mortality was held at Westminster, under the patronage of their Majesties King Edward VII and Queen Alexandra, on June 13-14, 1906, and presided over by the Right Hon. John Burns, M. P., president of the local government board, and a permanent organization effected. In 1908 the Dutch National League was founded, in 1909 the German Union for the Protection of Infants, and the American Association for Study and Prevention of Infant Mortality were organized in Germany and the United States, respectively; and in Spain, Switzerland, Luxemburg, Italy, Norway, Denmark, Bulgaria, Roumania, Russia, and possibly other countries from which returns have not been received, international committees have been organized or are now in course of organization. The Governments of Germany, Belgium, Norway, Holland, Bulgaria, Australia, and Uruguay have already voted, or promised, annual subsidies for the international union, and the movement for the reduction of infant mortality may therefore be said to have become firmly estab-

lished on an international basis. This brief summary of the origin, and review on broad national and international lines, of the movement would seem to justify the breadth of the title of this paper, and it is now in order to record as compactly as possible the results of the endeavor to ascertain on authoritative, first-hand information from the officials of the various leading countries and sections the present status of the movement in their several jurisdictions, and to trace in so far as possible the actual results of the movement up to date.

A GRAPHIC RECORD OF MOVEMENT OF INFANT MORTALITY RATES IN CERTAIN GROUPS OF EUROPEAN CITIES FOR THE DECADE, 1900-1909.



THE MOVEMENT IN VARIOUS COUNTRIES—GERMANY

With a view to securing the desired data, a uniform letter of inquiry was addressed, several months since, to the chiefs of the principal statistical bureaus of all the more important countries or sections of Europe, Australasia, Japan, Canada, and South America. A similar inquiry was addressed to the registration officials of all the registration States and the 50 leading registration cities of this country, but owing to the unfortunate shortcomings of the vital statistics of most sections of this country, not only was the form of the inquiry necessarily altered, but the results of the investigation in the case of the United States are scarcely comparable with those secured from many of the foreign countries. Succinctly summarized, the inquiries addressed to the statistical bureaus called for information as to (1) statutory action directly or indirectly bearing on infant mortality, (2) official bureaus, if any, created to care for child hygiene or the maintenance of milk stations, and (3) organized private efforts for the reduction of infant mortality. With the exception of Italy, Portugal, Scotland, Denmark, and Switzerland, replies were received from all European countries to which inquiries were addressed, and also from Japan, but it is perhaps needless to say, replies widely differing in character and value. Unfortunately, no returns have been received from South America, and none of value from any of the Provinces of Canada, with the single exception of Nova Scotia, but all possible data have kindly been supplied by the Commonwealth Statistician of Australia and the statistician of New Zealand, and in the majority of cases the European returns have been surprisingly complete and comprehensive. Without the hearty cooperation of the many officials in question the preparation of the paper would practically have been impossible.

To those personally acquainted with the scholarly and scientific work and methods of my German confrères it would be entirely needless for me to remark that in scope and volume the returns received from the officials of the German Empire and many of its States and cities were almost amazing. In fact, the correspondence and printed matter received from Germany undoubtedly exceed, by a comfortable margin, the entire output of all other countries and sections in response to my request for information. I have no thought of raising international questions at a gathering so essentially international in character as is this congress, but common fairness and a sense of deep

obligation to the statistical officials of the German Empire who have so cordially cooperated in the preparation of this paper compel me to make this frank, blanket acknowledgment. The officials of many other countries have done all that could have been expected of them in the way of cooperation, but both in amount and scope of its data Germany has unquestionably led as pronouncedly as it leads up to date in the systematization and thoroughness of its campaign for the reduction of infant mortality. France blazed the way, but Germany has perfected and lighted the road to the desired goal.

I regret that the limitations of this paper make it impossible for me to include in it a hundredth part of the detailed information as to the child-welfare work in the various States and leading cities of the German Empire which I have received in response to my inquiry. At most I can undertake only at present an outline sketch of the movement in the several countries and sections, but the German system, as now perfected, of centralizing and intelligently shaping the movement for the reduction of infant mortality is so admirably adapted for the great work in hand, and is replete with so many suggestions of value for similar movements in any large country, that any adequate treatment of it would demand a paper entirely devoted to that subject.

Dr. Fritz Rott, one of the medical directors and departmental chiefs of the Kaiserin Auguste Victoria-Haus, the impressive headquarters, at Charlottenburg, of the infant-welfare movement in Germany, has favored me with a most comprehensive review of the German movement in its entirety, and did space permit, the reproduction of his communication would present a clear picture of the great campaign which Germany has mapped out for itself. In the opening sentence of his letter Dr. Rott specifically states that "measures to reduce infant mortality in the German Empire on a large scale were not introduced until within the last decade. During the two preceding decades great attention was given to combating contagious diseases and to the social betterment of the working classes, so that the dangers of infant mortality have not been sufficiently brought to the attention of the people at large." The general trend of his letter, and the many other letters, books, and published statements received from German officials, would seem to indicate that the present-day broad, centralized, movement in Germany for grappling with infant mortality is practically traceable to the earnest personal identification of Her Majesty, the Kaiserin Auguste Victoria, with the campaign. Under date of November 15, 1904,

the Empress addressed a letter to the Vaterländischen Frauenverein (Patriotic Women's Society), urging the importance of all charitable societies uniting with the local authorities in promoting practical measures for the care of infants. This important stand taken by the Empress exercised immediate effect; organizations for the protection of mothers and infants were soon in course of formation in all parts of the Empire, and the foundation of the central organization, and the dedication of the great building bearing the Empress's name, on June 4, 1909, were the eventual results of her participation in the work.

It should by no means be understood that the first moves in the German campaign were those above mentioned, many States and cities having established "krippen" (the German term for crèches, or day nurseries), milk stations, consultation clinics for mothers and babies, and even gone so far as to offer money or other inducements for women to nurse their babies, long before the recent centralization and consolidation of the various local movements. As Dr. Rott puts it, it is "the idea of systematic protection to infants and centralization of such efforts which dates from the beginning of this century." An educational campaign for the instruction of mothers, present and prospective, by means of leaflets, pamphlets, and other printed matter has been extensively carried on in most sections of the Empire for several years, a notable infant-mortality exhibition was held in Berlin in 1906, and permanent museums for exploiting means of properly caring for infants, and so reducing infant mortality, have recently been established in the Kaiserin Auguste Victoria-Haus, at Charlottenburg, and at Munich.

The almost innumerable clinics, krippen, milk stations, and institutions for indigent mothers before and after confinement in Germany are regarded by the German specialists on infant mortality as but comparatively minor details of the great campaign needed to educate mothers on the care of their infants and to promote breast feeding. The Berlin statistics prepared by Breckhs, showing that only one-seventh of all the infant deaths reported were those of breast-fed babies, whereas the remaining six-sevenths were those of bottle-fed babies, made a profound impression on the German scientific mind and, as Dr. Rott states, "this furnished the best proof that the fundamental requisite in fighting infant mortality consists in emphasizing the fact that babies, especially the newly born, must be fed at the breast." The measures incidental to the educational campaign based

on this conviction are not so much matters of imperial law or State requirements, but are primarily administrative measures of the various municipal authorities, and the results of the activity of the Society for General Utility and private persons. In order to secure the harmonious, systematic, working of the various organizations in the German Federal States, State central offices have been established in many of the States, including Prussia, Hesse, Bavaria, Hamburg, Saxe-Altenburg and Baden. The several State governments aid in promoting their State central offices, which are also supported in the practical accomplishment of their purposes by provincial unions, the so-called main offices for the protection of mothers and infants. The main offices aim to concentrate the efforts of the different societies in their districts, without interfering with their individual independence, and the State and other organizations are welded together in a national league called the "German Union for the Protection of Infants," which was organized in 1909 and has its headquarters at Berlin. Under its auspices three German congresses have been held since 1909, at Dresden, Munich, and Darmstadt.

The course of the union and the State central offices is planned on the lines of scientific research, which is one of the principal purposes of the Kaiserin Auguste Victoria-Haus, at Charlottenburg, the headquarters of the child-welfare movement in the German Empire. The city of Charlottenburg, a municipality but practically a suburb of Berlin, presented the land on which the great building was erected, the Empress, in whose honor it was named, took an active interest in promoting it, and when completed and dedicated in June, 1909, it represented an outlay of 2,500,000 marks, or more than \$600,000. No other nation in the world has as yet filed even approximately such convincing evidence of its deep interest in the warfare on infant mortality, and the broad plans on which the institution is run are even more convincing, the president of the board of trustees being the royal chamberlain, Dr. von Behr-Pinnow, and the purposes of the institution being thus stated:

(1) To make scientific and practical investigations of the feeding and care of infants and mothers; (2) to collect material relating to infant mortality and data on organization for the care of infants in the German Empire and other civilized countries; (3) to place the results of its own scientific and practical investigations and collection of data regarding the care of infants and mothers at the disposal of the general

public, by publishing these results in instructive form and to render council and information to the Government, public and private organizations, and individuals.

At the express wish of the Empress, a school for nurses has been attached to the institution, physicians wishing to pursue special studies in the nutrition of infants have every opportunity at the institution and the various clinical stations, and there are departments with the latest facilities for confinements for both sick and healthy mothers and infants, laboratories, and every conceivable requirement of such an institution. Even stables for cows, donkeys, and goats, and washing and milking rooms are also attached. In the two years following its opening the institution had cared for 415 confinements, had accommodated 791 infants, and practically 100 per cent of all the mothers confined and under observation for at least six weeks had been able to nurse their infants. The institution covers an area of more than 4 acres, and its expenses are covered by a subsidy from the German Empire, grants from the Federal States, municipalities, societies, and the society of patrons of the institute. The fees for treatment and sustenance also amount to a considerable sum. The training of nurses and midwives, and the four school courses for mothers each year are regarded as among the most important and beneficial features of the institution.

The German Industrial Code provides that no woman may be employed in factories, workshops, etc., within a period of eight weeks before or after confinement, her reemployment being conditioned on proof that at least six weeks have elapsed since her confinement. The imperial insurance law also makes most comprehensive provisions for the payment of confinement allowances for anywhere from four to eight weeks and subject to compulsory insurance for the services of midwives and obstetricians. In addition to the provisions of the imperial insurance law there are benevolent organizations of large industrial establishments, private funds, various societies, and many communities which make more or less provision for needy women during confinement.

Infant dispensaries, and consultation clinics, patterned after the French "*Consultations de Nourrissons*," were first established in Berlin in 1905, and have now become so popular in Germany that about 200 communities and unions of communities maintain them. About 100 cities give nursing assistance or nursing premiums, generally in the

form of milk or cash, to needy mothers, and some cities give nursing premiums to midwives who have proved to further the cause of breast feeding. Some idea of the extraordinary breadth of the German movement on these lines may be gained by reference to the current issue of the *Statistisches Jahrbuch Deutscher Staadte* (1912 edition), which devotes 15 pages to the chapter on "Wochnerinnen und Säuglingsfürsorge" (women in child bed and infant protection), and presents elaborate tabulations of just what provisions each city of 50,000 or more population makes for needy pregnant, lying-in, or working women, infants, and foster children. In about 150 cities there are baby hospitals and infant homes, and near-by some cities fresh-air homes in the woods or on the seashore for the benefit of children. Special provisions are made for illegitimate and homeless children by professional guardianship in some 100 cities, and recently special regulations have been made for exceptionally endangered children—that is to say, babies syphilitic by heredity, an institution for the care of such unfortunates having already been established. As yet there are no special laws for the regulation of the day nurseries which now exist in about 150 cities, but a movement for their supervision has been started. A rigid supervision of the milk traffic and a careful control of the keeping of live stock are exercised by the proper authorities. There is no imperial law providing for the examination of milk in Germany, but as milk is an article of food, the authorities hold that the milk traffic is subject to the imperial law regulating the traffic in food, victuals, etc.

As previously stated, exceedingly interesting replies to my inquiries were received from many of the States and leading cities of Germany, but the limitations of this paper have made it necessary to condense the individual statements in a general summary for the Empire as a whole. The communication from the Grand Duchy of Hesse shows such a remarkable campaign for the reduction of infant mortality for a State of less than 1,300,000 population that at least a brief reference to its activities on these lines seems imperative. The efforts are centralized in the grand ducal central office for the care of mothers and infants, and in every one of the communities with less than 3,000 inhabitants every physician is required to supervise the care and feeding of all the healthy babies within his practice and for this service is paid a fee by the central office. In the 55 communities having over 3,000 population medical consultation offices are already, or shortly will be, established, and the whole grand duchy is divided into 18

administrative districts, each of which forms a branch office to which a nurse is assigned and by which medical consultation bureaus are established. There are about 36,000 births annually in Hesse, and it is reported that from 10,000 to 15,000 of these infants profit by the medical consultation offices.

With this hasty summary of the child-welfare activities of the Grand Duchy of Hesse, I must conclude the imperfect outline of the complex, and yet thoroughly systematized, effort which the German Empire is now making to reduce infant mortality—not only within its own borders, but in the world at large through the widely circulated publications for the common good of its investigations, experiments, and discoveries. In the subsequent summary of the showings of the tabulation of infant mortality experience of 68 European cities for the decade 1900-1909 appended to this paper, I briefly review the gratifying experience of 30 leading German cities. And, of course, granting that by no means all of the pronounced decrease in their several infant mortalities in recent years can be properly credited to the campaign now being waged, I believe that a study of the tabulation and accompanying chart will prove at least a partial case.

THE MOVEMENT IN GREAT BRITAIN

In 1858 the late Sir John Simon, K. C. B., F. R. S., was appointed to the newly created post of medical officer of Her Majesty's privy council, in Great Britain, in which position he served for many years, and in his "Introductory Report, addressed to the right honorable the president of the general board of health, by the medical officer of the board," under date of June, 1858, he declared that "the death rates of young children are, in my opinion, among the most important studies in sanitary science. In the first place, their tender young lives, as compared with the more hardened and acclimatized lives of the adult population, furnish a very sensitive test of sanitary circumstances; so that differences of infantine death rate are, under certain qualifications, the best proof of differences of household conditions in any number of compared districts. And, secondly, those places where infants are most apt to die are necessarily the places where survivors are most apt to be sickly; and where, if they struggle through a scrofulous childhood to realize an abortive puberty, they beget a still sicklier brood than themselves, even less capable of labor and even less suscep-

tible of education. It can not be too distinctly recognized that a high local mortality of children must almost necessarily denote a high local prevalence of those causes which determine a degeneration of the race." (Public Health Reports, 1858, Vol. I, p. 460.) In his first report to the privy council Dr. Simon also referred to the "neglect of children incidentally (but not unavoidably) arising from the employment of mothers in factories as one of our chief sanitary evils." He persuaded Dr. Greenhow to communicate to the general board of health, in form for publication by Parliament, some very valuable mortality tabulations which he had compiled from the unpublished data at the registrar general's office, and thus originated the series of "Papers relating to the sanitary state of the people of England." As an outcome of these revelations, the privy council ordered an investigation of the high mortality from diarrhea in certain large manufacturing cities, and this was followed in 1861 by another investigation "into the circumstances occasioning excessive infant mortality in Coventry, Nottingham, Blackburn, Birmingham, Wolverhampton and Abergavenny."

There is, therefore, positive evidence that the interest of the medical officers of England in the subject of infant mortality dates back at least 54 years, that interest has steadily increased to the present day, and it may be said with a certain amount of accuracy that in England the effort to diminish infant mortality practically began nearly 60 years ago. That great statistician, Dr. William Farr, who served for more than 40 years as the statistical adviser of the registrar general, and practically shaped the present English system of vital statistics, brought the subject of infant mortality before the Statistical Society (now the Royal Statistical Society) in 1865, and frequently discussed it in his contributions to the registrar general's annual reports. His successors for the last 32 years have followed his example, and for many years the tabulations and discussion of infant mortality experience have been recognized as important features of the registrar general's annual reports on births, deaths, and marriages in England and Wales.

In England, as in practically all other countries with the possible exception of France, however, the campaign against infant mortality is practically confined to the present century. In fact, it did not really assume a national character until, as a result of the attendance of certain influential British visitors at the First International Congress of Gouttes de Lait at Paris in 1905, the first National Conference

on Infantile Mortality was held at Westminster, on June 13-14, 1906, and a national organization effected under that title. As early as 1899 the first English milk depot, modeled after the French Goutte de Lait, was established at St. Helens, in Lancashire; and Liverpool, Bradford, Glasgow, Dundee, and various other municipalities had followed suit in the meantime. Here and there infants' consultations, patterned after the French Consultations de Nourrissons, had also been established in England, and many spasmodic efforts on a small scale had been made to grapple with infant mortality, but, as stated, the movement did not assume a broad, national character until the organization of the National Conference on Infantile Mortality, in 1906.

A second meeting of this organization was held at Westminster, March 23-25, 1908, at which representatives of the public-health authorities of about 150 cities, and many private organizations, were in attendance, and the president of the conference, the Right Hon. John Burns, M. P., president of the local government board, reported the passage of the children act of 1908 (consolidating the laws relating to children's protection), the notification of births act, and various other measures whose enactment was principally due to the vigorous efforts of the National Conference on Infantile Mortality. A third public meeting of the conference was held at Westminster on June 4, 1912, at which the following-named other organizations were represented: The National League for Physical Education and Improvement, the Association of Infant Consultations and Schools for Mothers, the National Health Society, the Women's National Health Society of Ireland, the Women's Imperial Health Association, and the National Society of Day Nurseries. At this meeting the president suggested the eminent desirability of coordinating the work of the various organizations concerned in the prevention of infant mortality, and the proposed organization was unanimously effected under the title of the "National Association for the Prevention of Infant Mortality and the Promotion of the Welfare of Children under School Age."

All authorities on the conditions of the English crusade against infant mortality seem to be agreed that the most important single step recently taken was the enactment of the notification of births act of 1907, which is optional with the local authorities of any borough, urban district, rural district, or county, or may be declared in force in any borough or district of England or Wales by the local government board, but has already been put in force in 320 boroughs and

districts, with a population of 18,386,912 out of a total population of 36,075,269. Steps are now being taken to adopt the act in some 40 additional districts, with a population of about 1,000,000, and the act therefore now is, or shortly will be, in operation in a territory with a population of approximately 20,000,000. The importance of the act in connection with the fight against infant mortality is in its requirement that the medical officer of health of a sanitary district receive information as to the birth of a child within 36 hours after the birth, thus making it possible for a female health visitor or other competent woman to tender personal advice to the mother in regard to rearing and feeding the child in cases in which the medical officer considers such visits desirable. Under the general registration act of 1836 and the deaths registration act of 1874 it was only required that births be registered within 42 days, and deaths within 5 days, of their occurrence, and in the parish of St. Pancras, in London, it was found that 12.74 per cent of the 6,114 births in 1904 were not registered for five weeks, 28.42 per cent. for six weeks, and 34.24 per cent for seven weeks, thus so delaying the registration in 75.4 per cent of the birth cases that the advice of health visitors often came too late. Under the 1907 act the birth must be reported to the medical officer of health within 36 hours, by the father if he be a resident of the house when it occurred or by any person in attendance on the mother at the time of birth or within six hours afterwards, on a prepaid letter or post card or by delivery of a written notice to the medical officer of health. The Royal Statistical Society, of London, has recently issued a comprehensive report of its special committee "appointed to inquire into the systems adopted in different countries for the registration of births (including stillbirths) and deaths with reference to infantile mortality," and its tabulations of the results of the inquiry show that no other country in Europe compels the registration of births within three days as a minimum. The exceptional value of the new English act in the cause of combating infant mortality by means of prompt advisory visits—and the possible discovery of the need for immediate medical attendance—is obvious.

The national insurance act of 1911, which became operative on July 15, 1912, provides for the maternity payment of 30 shillings in the case of the child-bearing wife of an insured person, or to the widow when the child is posthumous, or to the mother whether married or not if she is insured under the act. It also provides that if the mother

is attended by a midwife and a duly qualified medical practitioner is summoned, in pursuance of the rules made under the midwives act of 1902 (requiring that the midwife shall call in a registered medical practitioner if she observes certain conditions involving danger to the mother or child), the prescribed fee shall be recoverable as part of the maternity benefit. It has been estimated that more than 4,000,000 women come within the operation of the health insurance act of 1911, and in that event a very considerable percentage of the working women of the United Kingdom over the age of 16 years will have the aid of a maternity allowance of at least 30 shillings for each confinement under the new law.

There are various other British statutes which directly or indirectly apply to infant mortality, such as the midwives act of 1902, the factory and workshop act of 1901 prohibiting the employment in any factory or workshop, by the occupier knowingly, of a woman or girl within four weeks after she has given birth to a child, and the children act of 1908 which regulates the farming out of children under 7 years of age, and includes various other provisions for safeguarding children. There are also various statutes for the regulation of the milk traffic, inspection of cows, etc.

In 1907 the St. Pancras School for Mothers was started in the parish of St. Pancras, London, to supplement the work and cooperate with the municipal authority in the fight against infant mortality. It was the pioneer institution of its kind in Great Britain, was supported by voluntary contributions, and has so extended its work as to embrace the whole period from the expectancy of the mother to the compulsory school age of the child, and by association and cooperation with the day nursery and the nursery school has become "a comprehensive school of mothercraft and babe training," as its founder, Dr. John F. Sykes, D. Sc., M. O. H., has termed it. It bases its work against infant mortality on the discouragement of hand feeding and the encouragement of breast feeding, provides medical, economic, and educational facilities, and its work has attracted such wide attention and approval that more than 100 similar institutions are now in operation, on a larger or smaller scale, in England, Scotland, and Wales, some being run by the municipalities, but the bulk by voluntary contributions and private charitable organizations. In a general way these schools for mothers are modeled on the French Consultations de Nourrissons, but have materially expanded that idea. An

Association of Infant Consultations and Schools for Mothers has recently been established under the auspices and as a branch of the National League of Physical Education and Improvement, and the National Health Society and various philanthropic organizations have more than 1,000 paid, or voluntary, health visitors, who supplement the work and activities of the schools for mothers. The medical officers heartily cooperate with these varied institutions in so far as practicable, Dr. Arthur Newsholme, medical officer of the local government board, Dr. S. G. Moore, medical officer of health at Huddersfield, and many of their associates have made exceedingly valuable contributions to the statistical study of infant mortality, and under direction of the board of education a notable memorandum on the "Teaching of infant care and management in public elementary schools" was prepared by Dr. Janet M. Campbell, and published in 1910 (Circular 758), with a view to accelerating and shaping the movement on those lines now rapidly taking form in England. The Women's National Health Association of Ireland, the City Infant Mortality Committee of Dublin, and the 14 babies' clubs working under the management of branches of the National Health Association are actively engaged in the infant-welfare campaign in Ireland, and in Scotland many similar agencies in addition to those incidentally named on previous pages are at work.

In response to my inquiry, Dr. T. H. C. Stevenson, the statistician of the General Register Office, writes me:

My view as to the effect of the efforts already made in this country was stated as follows in the Annual Report of the Registrar-General for 1909, page xlv: "It is impossible to avoid associating this decline (i. e., in infantile mortality from 1900, and especially from 1905 onward) with the simultaneous increase of effort to reduce infant mortality."

In his introductory address at the recent meeting of the National Association for the Prevention of Infant Mortality the Right Hon. John Burns, president of the local government board, said:

Now you will probably ask me, as is your duty, what I believe are the chief causes of this satisfactory decline in infant mortality. I am here to say, as a practical man, that it is not due to any one special reason. It is due to a stream of causes, many experiments, and endless ideas, all converging on how to protect the mother, save the infant, guard the child, and reinvigorate the race. It is due to no special cause, or any special set of men.

THE MOVEMENT IN FRANCE

In the preceding study of the origin and evolution of the world's effort to diminish infant mortality, as the acknowledged pioneer in the movement in general, and also in many of its most important features, France of course occupied the front of the stage, and any extended review of the present status of the movement in France would be a mere repetition with comparatively unimportant supplemental details added. The Crèche, the Goutte de Lait, the Consultation de Nourrissons, the Pouponniere, and the Ligue Française contre la Mortalité Infantile of to-day are modern amplifications of those previously alluded to, materially increased in number, in efficiency, and in breadth of service. In so far as I have been able to learn, there have been no new forms or classes of institutions of importance established in France since the organization of the International Congress of Gouttes de Lait in 1905, with the possible exception of the Fondation Pierre Budin, which was founded in 1907 as a memorial to the distinguished pediatricist whose name it bears, and conducts on a large scale the Consultations de Nourrissons originated by him.

Dr. Lucien March, le directeur de la statistique générale de la France, has kindly advised me, however, of some important changes in the French law applying to infant mortality in the last few years, and it would seem that the Government is gradually becoming more closely identified with the movement, not only financially but in various other ways. The decree of May 2, 1897, and the regulations of December 20, 1897, provide for the supervision of crèches and places caring for children under 3 years of age. The law of June 27, 1904, places "enfants assistés" under the protection or guardianship of the State. The statute of November 27, 1909, guarantees their employment to lying-in women. The interruption of their work for eight weeks preceding and following their confinement will not warrant the termination of their engagement by the employer, on penalty of the recovery of damages with interest by the female workers concerned. By the law of March 15, 1910, a two-months' leave, half before and half after confinement, with treatment at institutions, is provided for, and the law of April 6, 1910, interdicts the selling, offering for sale, exposure, or importation of nursing bottles with tubes. The State has never participated as yet in the establishment or management of crèches, consultations de nourrissons, gouttes de lait, or similar institutions,

but has encouraged them by subsidies. In 1911, Dr. March informs me, these governmental subsidies amounted to slightly more than 600,000 francs, distributed as follows:

Oeuvres d'assistance maternelle, mutualités maternelles, consultations de	Francs.
nourrissons, gouttes de lait.....	465,205
Crèches	121,000
Subventions aux communes allouant des secours aux mères indigentes	
pendant le mois qui suit l'accouchement.....	13,795

THE MOVEMENT IN ITALY

In Italy the birth rate is high, the wages low, and the illiteracy exceptionally high, at last reports 506 out of every 1,000 women who married being unable to sign their names. The infant-mortality problem is therefore an exceedingly serious one, and a great variety of experiments in the way of grappling with it has recently been crowned with the creation of the first national maternity insurance fund ever established by any nation. The bill establishing this institution as was adopted by Parliament July 17, 1910, and was the outcome of an agitation on the subject dating back 16 years, the organization of a private maternity insurance institution having been first proposed at the Workingmen's Insurance Congress held at Milan in 1894. A private maternity insurance fund was established at Turin in 1898, and in the next few years at least five maternity benefit societies are known to have been organized in the larger cities of Italy, but the enactment on June 19, 1902, of the law specifically prohibiting the employment of women within one month after childbirth greatly aroused interest in the subject of maternity insurance. The law provided that in exceptional cases the period of nonemployment might be reduced to three weeks, if the mother could furnish a certificate signed by the local bureau of hygiene certifying that her health was such she could safely return to her occupation, but even in that event she would be enjoined from earning money for at least three weeks, and both chambers of Parliament adopted resolutions calling upon the Government to prepare a plan for the establishment of a maternity insurance institution in which membership should be compulsory for the female workers to whom the law applied, namely, employees of mines, factories, and workshops. The Italian bureau of labor was directed to investigate the probable cost of the proposed plan, in 1904 published its report, including 172,365 female employees in 2,654 establishments, and after six years of discussion of the subject in Parliament the law

of 1910 was enacted. It provides for a maternity benefit of 40 lire (\$7.72), three-fourths of which is to come from the fund and one-fourth from the State. A compulsory annual contribution is required from all women between 15 and 50 years of age to whom the law applies, to be paid in equal shares by employer and employee. For women between 15 and 20 the annual contribution is 1 lira (19.3 cents), and for women from 20 to 50 the annual contribution is 2 lire. The present imperial law of Germany and the new national insurance act of Great Britain provide for maternity insurance, but the Italian creation of 1910 was the first national institution of its kind in the world.

Half a century ago there was founded at Milan an institution under the name of the "Associazione Nazionale Operaia Femminile," which maintained a maternity section for the purpose of assisting mothers so that they might nurse their infants. Many other organizations, either charitable or self-sustaining on the mutual insurance principle, have since been established, with similar aims. The Brefotrofio, or foundling asylum, is an institution in evidence in nearly all parts of Italy, and several years since it was reported that more than 3,000 communes aided indigent mothers to enable them to nurse their young or hire nursing. Day nurseries are an established institution in Italy, dating back to 1850, only six years after the pioneer crèche was founded in Paris by Marbeau, and the present Italian law regulating the employment of women and children provides that in all factories where over 50 women are at work a room must be provided in which the mothers can nurse their babies. The Consultation de Nourrissons is not entirely an unknown institution in Italy, but apparently has made less headway there than in most European countries, the belief that breast feeding is not really needed being very common among the more ignorant mothers. In some communes a booklet dealing with the hygiene of infants is given to each newly wedded couple, there are several journals devoted to the hygiene of mothers and infants, and the Italian pediatricists have fully awakened to the importance of encouraging breast feeding as the surest means of reducing infant mortality, and through numerous channels are endeavoring to impress that fact upon the working classes of women.

THE MOVEMENT IN AUSTRIA-HUNGARY

For many years Austria has had the highest illegitimate birth rates of any European country—with the possible exception of Russia, for

which no recent figures are obtainable—and at least up to a very recent date led all the countries of Europe, aside from Russia, in its infant-mortality rate. In its extended reply to my inquiry the Imperial Royal Statistical Central Commission begins its communication with the frank statement: "The efforts along the line of infant care and protection of motherhood in Austria have the purpose of reducing the infant mortality in Austria, which still holds the enormous figure of 20 per cent." The communication goes on to note that the methods planned by the late Dr. Theodore Escherich, professor at the University of Vienna and founder and director of the Society for the Protection of Infants in Vienna, have opened the way for the present movement, and that the institution founded by Dr. Escherich has served as a model for similar institutions. His suggestion of the necessity for the establishment of a central office for the care of infants, the foundation of mothers' schools, and the education of women to the duties of motherhood, and the building up of an extensive propaganda for breast nursing, formed the basis on which Dr. Leopold Moll worked out his draft for an imperial institution in honor of the Emperor Franz Josef's jubilee. The draft was submitted to the Grand Commission of the Emperor-Jubilee-Fund for the protection of infants and child welfare, was unanimously accepted, and the proposed institution has been founded under the name of the Kaiser-Jubilaeums-Reichsanstalt für Mütterschutz und Säuglingsfürsorge.

The work planned for the institution consists of (1) the training of nurses, and orphan-asylum nurses already engaged in public institutions on all the Crown lands, and midwives to qualify them for infant nurses, and also of professional nurses and infant nurses; (2) establishing for physicians post-graduate courses in pediatrics and child hygiene; (3) the instruction of mothers in feeding babies and bringing up children; (4) helping motherless babies, destitute mothers, and their children, sick, underfed, and destitute children, and rearing needy, neglected, and defective children. In addition to the imperial institution, a central organization office for the care of infants and protection of children is to be established, and this office will have the threefold purpose of serving in an advisory, instructive, and legislative capacity. The imperial royal statistical central office is now engaged in an investigation of all existing institutions for the protection of infants and child welfare, and announces that recommendations and propositions advanced by scientists and commissions have been received with

deep interest and promise of careful consideration by the Government and its legislative bodies. Its reply to the inquiry concludes with a list of 21 infants' homes, day nurseries, and institutions for children under 6 years of age, all of which are located in Vienna.

According to the latest available returns, the birth rate and infant death rate in Hungary were even higher than those for Austria, and the rate of illegitimate births was also exceptionally high, though not so high as that of Austria. Consequently the two sections of the Austro-Hungarian monarchy have similar infant-mortality problems with which to deal. Nearly 35 years ago Dr. Szalardi startled the Royal Medical Association of Budapest with his revelation concerning babies born in Budapest and given out to country wet nurses to the effect that the municipal authorities admitted that fully 90 per cent of these babies died in the first year. An investigation of the Rokus Hospital disclosed that as high as 91.14 per cent of the illegitimate children born there died. When one of these unfortunates was handed over to one of the country wet nurses, the nurse received 20 gulden, and, it was said, was promised an additional 20 gulden if the baby died.

Hungary now boasts that these conditions are things of the past, and that it has one of the best systems of combating infant mortality, the first paragraph of its laws for State infant protection providing that "every child who can not be taken care of by his father or mother has a right to care by the Hungarian State." If possible, a baby's parents, grandparents, or other relatives are called upon to care for it, but if none of them can be made to do so the State cares for it until it is 15, this protection applying to all children in Hungary irrespective of their nationality or legitimate or illegitimate birth. Only sickly babies are kept in institutions, all others being given to foster parents selected and supervised by the State.

In 1910 no less than 54,478 children were under State protection, and the State first admits all children who seem to need its care, and afterward investigates the conditions of the case. The board of orphans looks into the case, decides what is to be done, and whether the child should be returned to its mother, and thus the child is not exposed to any great risk of neglect through the exercise of red tape. There are now 17 State asylums in Hungary in which children are cared for, and whenever possible the State insists that the mother remain for a while with her child in the asylum and nurse it. Indigent

mothers who work away from their homes are often admitted to the asylums on their promise to nurse their children and not go to work for a few months. All told, Hungary now appropriates between 81,000,000 and 82,000,000 crowns (approximately \$16,000,000) each year for the care of its child wards.

THE MOVEMENT IN BELGIUM

The Belgian law of December 13, 1889, dealing with women's work, children, and infants, prohibits the employment of mothers within four weeks after childbirth, and the Government's regulations for the examination of midwives since 1908 have provided that they shall be questioned as to the fundamental requirements of infant hygiene. The regulations also provide that conferences on infant hygiene shall be held in all arrondissements where the infant death rate is above the average for the kingdom. Sanitary measures recently recommended by the Government provide for the systematic supervision by the authorities designated of all places where children under 7 years of age are put to nurse, or to be cared for, and also provide that subsidies for Consultations de Nourrissons, or other public or private institutions for the protection of infants shall be apportioned according to the individual conditions by royal decree. For nearly 20 years the Government has enforced a carefully drawn code of regulations, from time to time amended, dealing with the milk traffic, and in 1894 organized action on Gouttes de Lait lines commenced in Belgium with the organization of the Belgium Société des Gouttes de Lait.

In his detailed and interesting response to my inquiry, M. Maurice Sauveur, secretaire generale du ministère de l'intérieur, states that Belgium has no official bureau of child hygiene, and maintains no milk stations or similar institutions, deeming it preferable to subsidize them. The Ligue Nationale pour la Protection de l'Enfance du Premier Âge has been in existence since 1903, and has maintained an active propaganda, promoted conferences, and otherwise aided in the movement against infant mortality. Two other associations, the Ligue de l'Education Familiale, which was founded in 1899, and the Société Belge de Pedotechnie, render like service in posting the public on child hygiene. There are about 40 consultations de nourrissons, some of which were founded by municipal communes but more by private enterprise, and about 50 crèches for the most part private institutions

aided by the communes. In addition to these latter, there are some crèches established by large industries. Some communes supplement their subsidies by distributing among young married couples brochures containing hints on the proper rearing of young children, and all told the Belgian Government annually appropriates about 30,000 francs in subsidies for child-welfare institutions. In 1905 the communal council of Ghent prohibited the use of nursing bottles with long tubes.

THE MOVEMENT IN RUSSIA

Unfortunately, the only Russian data for this paper forwarded in response to the inquiry addressed to the office of the ministère de l'intérieur comité central de statistique St. Pétersbourg were in the form of a 36-page tabular summary of the "Mortalité des enfants de moins d'un an en 1909 dans 38 gouvernements de la Russie d'Europe," arranged by districts, cities, ages, sexes, and various other classifications, the total deaths under 1 year in 1909 thus recorded aggregating 985,797 in the 38 subsidiary governments in question. The brief explanatory text accompanying these figures sheds no light on the methods or measures already taken, or contemplated for combating infant mortality in Russia, and I am therefore unable to present herewith any first-hand information on that interesting subject—in which not only the highest infant death rate of the civilized world, but more than one-half of the total infant mortality of all Europe are involved—with the exception of certain authoritative facts gleaned from (1) the exceedingly interesting paper presented before the Third International Congress for Infant Protection, at Berlin last year, by Dr. Wladislaw Hubert, of St. Petersburg, and (2) the Twenty-fourth Annual Report of the United States Commissioner of Labor.

Dr. Hubert is a privy councillor, president of the Russian Society of Public Hygiene, and an honorary lecturer at the Imperial Military-Medical Academy, and his paper on "The present status of the inquiry regarding the infant mortality in Russia and its reduction," unquestionably constitutes one of the broadest and most instructive reviews of that highly interesting topic which has ever appeared to date, at least outside the field of Russian publications. His paper was read and published in German, in the voluminous Transactions of the Third Congress, and at the very outset concedes that more than 1,500,000 of the 5,000,000 to 6,000,000 children annually born in European Russia

die during the first year, or in other words, that the infant mortality rate of European Russia as a whole exceeds 250 per 1,000 births. And in a startling tabulation included in his paper, Dr. Hubert shows that in 280 out of 501 districts the infant death rate exceeds 250 per 1,000 births, in 271 districts ranging from 300 to 450, and in no less than 10 districts amounting to 500 or more. The vast majority of the Russian working population of about 125,000,000 are neither thrifty nor energetic, Dr. Hubert tells us, and the high infant mortality operates to the detriment of the national organism, and so affects the physical and mental powers of the population as to lower the productive and economic strength of the nation. As he puts it:

It is therefore clear, and important, that the broad interchange of views on these questions at the coming Russian Congress for the Reduction of Infant Mortality to be held at St. Petersburg in April, 1912 (Dr. Hubert's address was delivered in September, 1911), will constitute a real development.

The recognition of the great importance which breast feeding plays in the fight against infant mortality has led to the establishment in many Russian cities of "Milchtropfen," or "Gouttes de Lait," and one of the first experiments on this line was made in 1901 under the auspices of the Society of Public Hygiene at the St. Petersburg municipal institution for prematurely born children. At last reports there were 6 milk stations in St. Petersburg, handling about 800 babies, and in 1909 there were about 40 in various cities and 7 in villages in Russia. The first day nursery in Russia was founded by Prince Barjatinsky in 1845—the year following the establishment of Marbeau's pioneer crèche in Paris; the second in 1865 by the Countess Miljutin, and there is now a large number of day nurseries in all sections of the Empire under either municipal or private direction. On August 17, 1911, the Russian Society of Public Hygiene appointed a permanent committee to the International Union for the Protection of Infant Life. In so far as I have noted, no announcement of the deliberations or results of the Russian Congress for Infant Protection and the Reduction of Infant Mortality, which was to have been held in April last, has yet appeared in any American or European publications outside of Russia. But the program, which had been announced, was broad and promising, comprising these three sections: (1) Study and statistics of infant mortality; (2) Causes for the excessive infant mortality in Russia (3) The crusade against infant mortality.

In the latest issue of the annual report of the United States Commissioner of Labor (Twenty-fourth, Vol. II, pp. 2210 et seq.) it is

authoritatively stated that the regulations for the Province of Moscow, outside of the city of Moscow, laid down by the provincial factory commission, provide that in factories—

where 200 or more women are employed, a special maternity room must be provided and also the services of a resident trained midwife; where less than 200 women are employed, such room and the services of a midwife must be furnished by the employer when necessary. Only three commissions, those of St. Petersburg, Moscow, and Warsaw Provinces, require maternity wards in factories employing considerable numbers of workers. A few commissions have established a maximum time limit of three months for this free medical help.

THE MOVEMENT IN ROUMANIA

Although the population of the Kingdom now amounts to nearly 7,000,000, is nearly as large as that of Belgium, and exceeds the populations of Turkey, the Netherlands, Portugal, Sweden, Switzerland, Denmark, Greece, and Norway, Roumania is practically a terra incognita at this end of the world, and probably the vast majority of students of the infant-mortality problem would fail to take that country into account in striking the world's balance sheet of movements for the reduction of the infant death rate. It must be borne in mind, however, that Roumania has a population more than one-half again as large as is the total population of the Australian Commonwealth, that its population for many years has been increasing at a much higher rate than that of any other European country of equal size with the exception of Germany and Russia, and that its birth rate is the highest in Europe with the single exception of that of Russia. These facts obviously call for the consideration of Roumania in the discussion of the infant-mortality crusade, and the active participation of the country in this movement fairly entitles it to that consideration. The output of its statistical bureau, known as the service de la statistique générale, under the administration of its director, Dr. Leonid Colescu, is amazingly comprehensive and complete for that of a country of the size of Roumania, and in all the voluminous correspondence incidental to the preparation of this paper no country of similar magnitude has approached it in the volume of data supplied. Included in the information furnished are two papers by Madame Marie Coutzarida Cratunesco, presidente de la Société Maternelle des Crèches, at Bucharest, and doctor in medicine of the faculty of Paris, which were presented by that lady at the Congrès de l'Assistance Publique

et des Oeuvres de Bienfaisance and the Second International Congress of Gouttes de Lait, and deal respectively with the crèches and divers institutions established in Roumania in the crusade against infant mortality. From these papers, the various statistical reports, and the correspondence with which Dr. Colescu has favored me, I have compiled this brief and incomplete sketch of Roumania's activities on these lines.

Article 81 of the Country's sanitary law requires the mayors to pay especial attention to abandoned children, nursing babies, and the newly born, and the same article provides that pregnant and lying-in women, the aged and infirm, and the orphans of the poor shall be under the special care of the communes. In furtherance of the provisions of this law, various institutions have been established, some of which are herewith briefly mentioned. The oldest is l'Institut Gregorian, at Issy, founded by Prince Gregoire Ghica, where abandoned babies are placed and cared for. The institution known as the Berceau Sainte Catherine was founded by the Princess Catherine G. Cantacuzène, with the cooperation of many of the most prominent ladies in Roumanian society, was opened November 25, 1897, and is devoted to the care of children of poor families up to the age of 2 years. Under the direction of the chief of the sanitary office a section of this institution is especially provided and run for babies of the poor whose mothers have died in or immediately following childbirth. The institution is liberally endowed, has a large and thoroughly equipped home of its own, has rendered effective service for the last 15 years, is conducted by La Société Leaganul ou Crèche Santa-Catherine, and is run on the general plan of the Pouponniere at Porchefontaine, near Versailles, in France, the pioneer in its line. The institution known as the Materna is conducted by a committee under the presidency of Madame Dr. Cratuneseo, and the municipality of Bucharest there cares for abandoned children up to the age of 7 years, and also for the babies of the working poor who are prevented by their work from caring for them. All of these institutions are located in the capital of the kingdom, Bucharest, and there also are located a crèche conducted by M. Cantacuzino, and a crèche in close proximity to a great tobacco establishment at which the babies of the women there employed are cared for during the day. Day nurseries are run by

society women at Braila and Galatzi, and at Craiova there is the institution known as "Madona Dudu" at which the babies of the poor are cared for.

The municipal hospital at Bucharest, "L'Ephorie," has a sanitarium at Techirghiol at which poor children with tuberculosis are received, and the Bucharest Société pour la Prophylaxie de la Tuberculose des Enfants also has a sanitarium at the same point to which children up to 12 years of age are admitted. The State makes a substantial appropriation for the support of this institution, and also maintains in whole or part various other hospitals or homes for infants and children. All told, Roumania has a surprisingly large equipment of hospitals, crèches, and gouttes de lait, and is unquestionably contributing its full share to the fight against infant mortality.

THE MOVEMENT IN OTHER EUROPEAN COUNTRIES

In addition to the European countries whose kind responses to my inquiry have already been reviewed, returns to the inquiry have also been received from the bureau central de statistique des Pays-Bas, the bureau municipal de statistique, of Amsterdam; bureau central de statistique, of Norway; el director general del Instituto Geográfico y Estadístico, of Spain; and the bureau central de statistique de Suède. Dr. Philipp Falkenburg, the director of the Amsterdam bureau, writes that a book by Prof. Keller, of Berlin, shortly to be published at Jena. will contain a study by Dr. Graanboom and Dr. van Heusde on the subject of infant mortality in general and the efforts for its reduction in the Netherlands. The Norwegian bureau central de statistique is authority for the statement that there are now two lying-in hospitals officially conducted, one in Kristiania and one in Bergen, and that both are combined with schools for midwives and consultations de nourrissons. The State also contributes to homes for mothers, three in Kristiania, one in Bergen, and one in Stavanger. The "Rigshospital" maintains a division especially devoted to children; new milk is distributed extensively for babies from several divisions of "Norske Kvinders Sanitetsforening"; and homes and charitable institutions for the care of infants and children are supported by private efforts in all parts of Norway.

The director in chief of the bureau central de statistique de Suède, Dr. Jacob Ludwig Widell, announces that—

by way of legislation little has been done directly to diminish infant mortality. This has in Sweden, as you will observe, already long since been so very low that statutory action has been less needed here than in other countries. The mortality in the first year of life per 1,000 living births was 81 in 1906, 76.8 in 1907, 85.4 in 1908, 72.2 in 1909, and 75.1 in 1910. A great deal of private effort, however, has been made for reducing infant mortality still more. Especially deserving of mention in this conjunction is the establishment of milk stations and krippen in many towns.

In addition to the European data already presented, a brief post-script might be added in the form of the statement that Austria, Bosnia and Herzegovina, Denmark, Holland, Norway, Roumania, Spain, and Switzerland all now have statutes prohibiting the employment of child-bearing women for anywhere from three to eight weeks after confinement. The Spanish law of March 13, 1900, also compels employers to allow at least one hour without deduction of wage, each day, for the nursing mother to nurse her baby, and this hour may be divided into two half hours at the mother's pleasure on her notifying the employer of the times so selected.

THE MOVEMENT IN AUSTRALIA

Though geographically far distant from the centers of European activities in the campaign against infant mortality, Australia has "felt the touch" of the movement and has energetically responded. In fact in some respects the movement on the other side of the world has been more systematically mapped out and carried out than in many a much larger, older, and wealthier eastern country. Mr. G. H. Knibbs, the Commonwealth statistician, writes that "practically the whole of the information available in this bureau on the subject of the importance to diminish infant mortality is embodied in the fifth Official Year-Book," which he has sent to me, and in that extraordinary work of 1,277 pages I find an entire chapter devoted to the subject of "Supervision of infant life," and an impressive array of tabulations and graphics dealing with infant mortality in various sections of the Commonwealth.

As all familiar with the relative infant-mortality rates of various sections of the world are of course aware, Australia has never ranked among the sections with high infant death rates, but has continuously been at the very bottom of the list of countries arranged in the order of their rates graded downward. In 1901 its rate was but 103.61 per

1,000 births, and from 1903 to 1910 it underwent a practically continuous decline from 111.36 to 74.81. This latter figure was lower than those of even Norway, Sweden, and Ireland. At the introduction of his chapter on "Supervision of infant life" Mr. Knibbs modestly puts it for Australia:

It has been frequently stated in recent years that when the social, climatic and industrial conditions are taken into consideration the infantile mortality of Australia, particularly in the large towns, is much higher than it should be.

In view of the fact that the Australian rate is considerably less than one-half as high as the average infant-mortality rate for all the countries of Europe in the quarter century ending with 1905, this statement that it "is much higher than it should be" may be fairly termed a modest one, I think.

With this start the Commonwealth statistician goes on to remark:

It is now generally recognized, however, that infant mortality is largely attributable to parental ignorance and neglect, and that in particular improper feeding is accountable for perhaps the majority of infant deaths. In all the States of the Commonwealth acts have been passed with the object of generally supervising the conditions of infant life and of reducing the rate of infantile mortality, and in many of the large towns measures have been adopted by private individuals to spread among the mothers a knowledge of the best methods of feeding and caring for their infants. Milk institutes have also been established after the manner of the Gouttes de Lait in Europe, with the object of reducing the number of deaths of infants from milk poisoning in the summer months. For every infant death recorded there are probably three or four survivors who have sustained more or less serious permanent physical danger quite apart from injuries at birth or congenital causes. It is stated that the far-reaching influence of the first year or two of life upon the whole subsequent physical welfare of the individual can not be recognized too clearly, and it has been alleged that many serious defects and diseases occurring in later life may be credited to results ensuing from infantile diseases. This is particularly the case in respect of digestive diseases.

In New South Wales, Western Australia, and New Zealand a statute is in force prohibiting the employment of women within four weeks after childbirth. In New South Wales, Victoria, and Queensland infants' protection acts provide for the licensing and regulation of homes to which young children may be farmed out, and in New South Wales there is a State children's relief board under the direct control of an honorary board of nine members and under the administration of the minister of public instruction. In all six States of the Australian Commonwealth there are more or less comprehensive regulations applying to the supervision of the milk traffic.

The acting government statistician of New South Wales advises me that—

The medical officer of health of the Sydney combined sanitary districts, Dr. W. G. Armstrong, for some years past has made systematic efforts toward instructing mothers of newly born children. He has a staff of three trained nurses, inspectors who visit about 55 per cent of the children born in the metropolitan area within five weeks of birth. The mothers are presented by these inspectors with a copy of the pamphlet on *How To Take Care of Babies*, issued by the department of public health, or with leaflets on the same subject distributed by the city council. Naturally these visits are paid only to the thickly populated, poorer districts, and the nursing inspectors are at all times well received by the mothers. Again, when the birth of a child is being registered, the district registrar of births supplies to the parents a copy of the pamphlet above mentioned. This work has now been carried on for eight years, and the work of visiting the mothers of newly born children has been actively continued in the city of Sydney for seven years with results which appear to be very satisfactory.

In the city 1,554 mothers were visited (395 primiparæ), of whom it was found that 1,291, or 83.1 per cent, had entirely breast fed their infants up to the time of visitation; 231 infants were partly breast fed, and 32 were not breast fed at all. In the suburbs 2,099 mothers were visited (564 primiparæ). In 1,751 cases, or 83.4 per cent of the whole, the children at the time of the first visit were found to have been entirely breast fed, 279 children were partly breast fed, and 69 were entirely artificially fed. It will be noted that the proportion of breast-fed children in the city of Sydney has increased steadily year by year since the inception of the practice, a fact which may be considered very encouraging. All the nursing mothers, both in the city and suburbs, were presented with the pamphlet issued by the department of public health entitled *How To Take Care of Babies during the Summer Months*. In the infants' homes, principally for the poor and unfortunate, fully 50 per cent of the cases treated are of illegitimate births. In these homes the mothers are frequently admitted with the children.

In Melbourne the Lady Talbot Milk Institute was established in 1908, to provide pure milk for infants, and in the first annual report it was stated that out of about 300 infants supplied with milk by the institute during 1908-9 only 8 died. Crèches have been established in many of the suburbs of Melbourne and also organized by private enterprises in other large towns of the Commonwealth. In Sydney there is a school for mothers, the Alice Rawson School, to which parents are invited to take their children by the nursing inspectors of the city council. The mothers are then kept in touch by the nurses of the school by visits at regular intervals—thus continuing the work begun by the nursing inspectors. In short, Australia has intelligently and

energetically grappled with its share of the infant mortality problem, even though the States of Australasia already have, and long have had, the very lowest infant death rates in the world.

THE MOVEMENT IN THE UNITED STATES

The differences between far-away Australasia and the United States, it is needless to say, are many and striking, and in their respective infant-mortality rates and methods of dealing with the infant-mortality problem the differences are particularly striking. The States constituting the Australian Commonwealth are effectively welded together, and much more effectively welded together than are the States of the United States in the handling of problems like that which is the subject of this paper. In the case of both commonwealths, in many things the interests of their respective entire populations are substantially identical, but in many respects it would seem that the State lines in this country are much more sharply drawn than in Australia. Consequently, in the handling of, for instance, even the broadest questions of public health in which infant mortality plays so conspicuous a part, there is a lack of unity of plan and concentration of effort in the United States, which is, to put it mildly, lamentable.

To be sure, there now is, and has been for substantially three years, a national organization in this country under the name of the American Association for Study and Prevention of Infant Mortality, whose purpose is to nationalize and systematize the movement which its name suggests. This association has already held two annual conventions, and its third convention is scheduled for next week, at Cleveland, and that it has already done much to attract the attention of the American public to the infant-mortality question and been directly responsible for the establishment of milk stations and baby-welfare organizations in many American cities—and that its cumulative influence and broadening zone will eventually be productive of still more notable results—there is not the slightest question. Up to date, however, the most patriotic and self-satisfied American spokesman, with even superficial knowledge of relative values in the world's campaign against infant mortality, could scarcely contend that the United States as a whole had as yet actually grappled with the problem on any such basis as have, for instance, Germany, France, and Great Britain.

No physician with any reputation to lose would be willing to prescribe in a case of whose fundamental facts he was practically in total ignorance, and it is scarcely to be expected that a nation can or will seriously devote its money and attention to a problem in the case of which even an approximation of the dimensions is unknown and almost unknowable. It would be entirely unnecessary, not to say humiliating, to advise this notable body of demographers of the defective registration and varying accuracy of American vital statistics, and I have no intention of expanding on that topic. The world's statistical authorities having long since agreed on the uniform method of measuring infant mortality rates, namely, by working out the ratios of deaths under 1 year to registered living births, and not a single American city of any magnitude in so far as I am aware even pretending now to have a complete registration of the living births occurring within its confines, it is obviously a physical impossibility to compute with accuracy the infant mortality of any city of importance in this country—let alone any single State, the registration area, or the United States in its entirety.

Fortunately, there are a few American States which for some years have had, comparatively speaking, fairly accurate registrations of births and deaths, for instance, Massachusetts and Connecticut. And by a glance at their infant-mortality figures for the decade ending with, say, 1909, we may obtain at least a straw or two of evidence as to the general trend of infant mortality in this country, finding that in both of these States not only was there a considerable decline in the apparent infant death rates, but also in the actual numbers of infant deaths despite the increasing populations, in the decade in question. In New York City, Philadelphia, Boston, and at least a few other cities of importance with fairly complete birth registration there have been corresponding decreases in recent years, and it would seem reasonably safe to conclude that a complete enumeration of living births and deaths under 1 year would show at least a slight decrease, and certainly no increase, in this country's infant mortality of recent years.

I have supplemented the text of this paper with a tabulation of the infant-mortality experience for the decade ending with 1909 of 68 European cities, separately considered and also grouped by nations, have graphically traced the results of these tabulations in the chart which has been shown to you, and at the outset of my work on this

paper had hoped that the collection of detailed returns from certain leading American cities might make possible the preparation on a much smaller scale of similar American tabulations and charts. In response to the inquiry addressed to the registration officials of all the registration States, and 50 of the leading registration cities, of this country, comparatively speaking only a mere handful of data has been forthcoming, although in some cases the officials in question undoubtedly have supplied practically all the information along the lines named which was at their disposal. In so far as statistical compilations are concerned, the American yield of the inquiry, it must be frankly admitted, is without the demographic pale, and I have found by actual experiment that any tabulation or chart based upon these data is practically meaningless and valueless. For these reasons it is impossible, in my judgment, to make any serious attempt, worthy of presentation before such a body as the division of demography of this congress, at even approximately measuring the past or present infant mortality of the United States as a whole, or of any considerable part of it. In brief, in the case of this country the effort to diminish infant mortality can only be treated on the basis of single units—that is to say, by roughly outlining the efforts which have been made or are now being made in a few of the more important cities.

New York City is not only the metropolis of the United States, and incidentally the Western Hemisphere, but is also by far the most conspicuous city of this continent from the viewpoint of the welfare now being waged against infant mortality. It therefore occupies the very center of the stage in the consideration of that movement in this country. As a municipal measure, the movement in New York City dates back scarcely 10 years, but in 1873 the New York Diet Kitchen Association was founded for the purpose of distributing nourishing food to the sick poor, of course to babies as well as adults. In 1891 at the Good Samaritan Dispensary pasteurized milk modified to a set formula was supplied to sick babies during the summer months, and in 1892 Nathan Strauss founded his pasteurized milk laboratories, opened his pioneer milk-distribution depots in New York City, and thus inaugurated the beneficent plan which has been so materially expanded by him, and introduced in many other cities, in the last 20 years. The Children's Aid Society entered the field in Brooklyn in 1901, temporarily established some milk depots in charge of a matron, and the health department supplied a physician to supervise the preparation of the pasteurized milk there dispensed.

Up to this time, the health department had only been identified with the movement against infant mortality to the extent of having a small summer corps visit sick babies in the tenements, but in 1902 it inaugurated a house-to-house canvass of the worst tenement districts. Nurses were assigned to follow up the cases in which they were needed, over 200,000 families were visited, dispensaries were established at recreation piers, and an inspection of the city's milk supply was undertaken. Its work on these lines gradually expanded, but it was not until 1908 that the division of child hygiene of the health department was established and provided with a chief, 5 assistant chiefs, 16 supervising inspectors, 1 superintendent of nurses, 5 supervising nurses, and 195 district nurses. The commissioner of health called a conference of all organizations and agencies interested in the campaign against infant mortality, the activities of the division of child hygiene were steadily expanded, and in the fall of 1910 the board of estimate and apportionment, impressed by the results of the 7 milk stations established by the New York Milk Committee in 1908, and continued on a larger scale in 1909 and 1910, appropriated the necessary fund for maintaining for the entire coming year 15 infants' milk depots under municipal control and under the immediate management of the division of child hygiene. Thus for the first time was the greatest city in the western world formally committed to the municipal maintenance of infant milk stations.

The New York Milk Committee had been organized in 1906 by a number of public-spirited New Yorkers as a result of a conference called by the commissioner of health, the committee being especially designed to investigate the milk problem. In 1908, as above stated, this committee had opened 7 milk stations and, together with certain other charitable organizations, maintained a small number of these stations up to 1910. The appropriation by the board of estimate and apportionment in the fall of that year of the fund for the establishment of 15 of these stations at municipal expense aroused the New York Milk Committee to increased energy on these lines, the committee appointed a branch committee for the reduction of infant mortality, and that subcommittee was authorized to plan a campaign, raise money and effect if possible a demonstration of the possibilities of milk stations on a wholesale basis.

With Mrs. J. Borden Harriman as chairman of its finance committee and a large number of other well-known society women asso-

ciated with her, a vigorous canvass for funds was made with the well-to-do community of New York City, and although the canvass did not start until April, on May 31 the last of the 27 milk stations which the committee had planned was opened. At the invitation of the commissioner of health, the association of infants' milk stations was organized in that month by the 8 various agencies interested in the publicity campaign for the reduction of infant mortality and maintaining 79 milk stations, by a committee of the association the city was restricted so as to prevent duplication of effort, and it was arranged that each station should send in a weekly report showing its enrollment and supplying all details of importance for tabulation and interchange.

At this writing, the 55 milk stations for which the city of New York had appropriated the necessary funds were in full operation, the Little Mothers' League, which had been inaugurated under the direction of the division of child hygiene to interest "the little mothers" of the public schools in the care of babies and general hygiene, had emphatically proved its usefulness, and the Junior Sea Breeze Hospital of the Association for Improving the Condition of the Poor, the Nathan Strauss Pasteurized Milk Laboratories, the Children's Aid Society of Brooklyn, the St. John's Guild, and various other agencies of proven ability were all playing active parts in the babies'-welfare movement in New York City. By means of the Babies' Welfare Association, recently organized, a particularly practical coordination of all the various agencies, municipal and charitable, identified with the milk stations of New York City was effected, returns on uniform lines are now collected, tabulated, and made public in weekly statistical bulletins, and the wide scope of the movement is demonstrated by the bulletin for the week ending September 14 last. In that week the total attendance at all the milk stations aggregated 17,535, no less than 65,940 quarts of milk were dispensed through the stations, and from January 1, 1912, up to September 14 last the total number of recorded deaths under 1 year in the city of New York had been 10,545 as contrasted with a total of 11,116 infant deaths in the corresponding period of 1911. The 17,535 babies brought to the stations in the week in question represented considerably more than 10 per cent of the supposed population of New York under 1 year, and it would therefore seem that the greatest city in the United States was now committed on a wholesale basis to the "goutte-de-lait" plan inaugurated in France just about 20 years ago.

Of course, the present modified fundamental purpose of these institutions is really the encouragement of breast feeding, and the education of the ignorant class of mothers on proper methods of rearing their young; and the sale of good, safe, milk at a low figure— or its gratuitous distribution in cases of extreme poverty—practically is now only a means to those ends, rather than the primary purpose in view. In all probability the identification of New York City's municipality on a wholesale basis with this milk-station movement was materially accelerated, if not actually inspired, by the preliminary educational work on these lines of the New York Milk Committee. It was this committee, or its subcommittee for the reduction of infant mortality, which directly shaped the case, and presented the tabulations and charts which led the board of estimate and apportionment to appropriate the funds in the fall of 1911 for the 55 milk stations which were to be continuously maintained by the city for the entire year dating from their establishment, and in all probability from that time on.

Under the active direction of Paul E. Taylor, secretary of the New York Milk Committee and director of the committee for the reduction of infant mortality, and Dr. Philip Van Ingen, medical director of the last-named subcommittee, an elaborate special report of the subcommittee for the reduction of infant mortality of the New York Milk Committee was compiled and recently published, including a great mass of statistical tabulations and charts illustrative of the campaign against infant mortality in New York City and other leading American cities. This report was undoubtedly the most comprehensive work of its kind ever published in this country, and in all probability in any country, and promises to prove an educational instrument of far-reaching service. In the main, the preceding out-line of the history of present conditions of the movement in New York City has been compiled from this report.

Several other leading cities of the United States are now making vigorous efforts on lines similar in a general way to those of New York City to reduce their infant mortality, but, in so far as I am aware, Rochester, N. Y., is the only other American city which has formally established a milk station, or stations, at municipal expense. Chicago's health department has had physicians make a house-to-house canvass among the mothers of the poor for the last four years during the summer months, has extensively circulated literature in relation to the care of the baby, and for the last three years has earnestly cooperated

with the United Charities, the Infant Welfare Association, the Civic Federation, and other public-spirited organizations of the city. In Philadelphia in 1910 a conference called by the mayor was attended by some 200 representatives of agencies engaged in work in this field, the Modified Milk Society established 18 milk stations, and a division of child hygiene was established by the city's health department. In 1911 a "milk show" was held in the city at which the attendance exceeded 110,000, and the city council voted \$5,000 for summer work among the babies of the poor.

In St. Louis, the Pure-Milk Commission was incorporated in 1904 for the purpose of distributing modified milk to poor babies, and in 1911 the Save the Babies League was formed, but the health department of the city apparently has taken no active part of the work up to date. In Baltimore, the Babies' Milk Fund Association, and the Maryland Association for the Study and Prevention of Infant Mortality have done some excellent work, and in 1911 nine milk stations were maintained and weekly clinics for babies held at them. Detroit has provided similar agencies for the last two years. Louisville, Rochester, and certain other cities have endeavored to exercise supervision over the milk traffic and in various ways provide good milk for poor babies, and the city of Cleveland has been especially active in the fight against infant mortality. Cleveland now maintains 13 prophylactic dispensaries employing 22 nurses as home visitors, and on June 16, 1911, the Central Dispensary and Milk Laboratory was dedicated to the babies of Cleveland. It is now proposed to erect and maintain a special hospital for babies, at a cost of about \$325,000, and an annual expense of nearly \$50,000, and it is planned to raise \$1,000,000 for the erection of the building and its endowment. The city's board of health maintains a department of child hygiene.

In Boston, the division of child hygiene of the health department endeavors to get information regarding every baby born in Boston. Dr. W. J. Gallivan, chief of the bureau, writes that 10 nurses are assigned to this work, a duplicate of every birth return is sent to the division by the city registrar, and either by letter or visit of a nurse an attempt is made to learn how the newly born baby is going to be fed. The work of the division is subdivided into prenatal and post-natal work, medical inspection of schools, and physical examination of every child under 16 who seeks employment. The private agencies active in the campaign against infant mortality are the Floating Hos-

pital, the Milk and Baby Hygiene Association, and the efforts of Mrs. William Lowell Putman, who has employed a nurse to investigate the care of expectant mothers. The Milk and Baby Hygiene Association for the last three years has been in the very forefront of the movement in Boston, and during the last year had nearly 3,000 babies under its supervision, 10 milk stations being carried on by the association and mothers' clubs and classes of "little mothers," summer outings and various other means of endeavoring to reduce infant mortality being actively employed by the association.

A reprint of one of the Public Health Reports, published last year by the Public Health Service of the United States and compiled by J. W. Kerr, Assistant Surgeon General, presents a compact and very interesting résumé of "Data regarding operations of infants' milk depots in the United States in 1910," including data from 43 institutions located in 30 cities. Of these 43 depots 29 were maintained by private means, one partly by private means and partly by public appropriations, and regarding the means of maintaining the balance of the stations no information was forthcoming. New York and Pittsburgh are stated to be the only cities known to have provided funds for carrying on such work. A most elaborate colossal work dealing with the various phases of the relations of milk and the public health was also published by the United States Government, and many interesting casual studies of this and other phases of the infant-mortality problem have been issued by the various States' health departments.

To the best of my knowledge, the American Association for Study and Prevention of Infant Mortality, which was organized at New Haven, Conn., in November, 1909, and now numbers among its members a large number of baby-welfare organizations in various cities, and the Federation of Day Nurseries are the only organizations on a national basis in the United States which as yet could fairly be said to be directly associated with the movement for the reduction of infant mortality. The Federation of Day Nurseries is the outgrowth of two informal conferences held in Boston in 1897 and in Chicago in 1898, and it and the broad development of the day-nursery idea in the United States are largely the results of the personal work of Mrs. Arthur M. Dodge, of New York City, who has both fathered and mothered the movement in this country, so to speak, has studied the day-nursery, or crèche, plans of all the more important countries of the world, and for many years has been the very soul and center of this

movement in the United States. The first day nursery in this country, if it may be so termed, was the Nursery and Child's Hospital in New York City, which was incorporated in 1854, "for the maintenance and care of the children by wet nurses and the daily charge of infants whose parents labor away from home." This was 10 years after the establishment of the pioneer crèche in Paris, by Marbeau, and the movement has so expanded in the last 58 years that there now are about 500 day nurseries in the United States, at which some 20,000 or more children are cared for daily. Approximately 20 per cent of these children are babies under 1 year, and the day nurseries of the country in the main make a practice of caring for these children, if so desired, up to and even after their arrival at school age. There are local associations of day nurseries in New York City, Chicago, Philadelphia, Boston, and St. Louis.

Although practically all the countries of Europe and most if not all the States of the Australian Commonwealth have long had statutes prohibiting the employment of child-bearing women for anywhere from four to eight weeks after their confinement, there are but two States in this country which now have such laws on their statute books, and both of these laws are practically dead letters up to date, the provision reading that "no woman shall knowingly be employed in labor in a mercantile, manufacturing, or mechanical establishment within two weeks before or four weeks after childbirth," and not even suggesting any means by which the women so debarred from their employment after childbirth may be supported in default of their customary earnings. Of course self-preservation will compel the woman whose only means of support is thus cut off to conceal in so far as possible the fact that she is about to bring, or has just brought, a child into the world, and the experience with a similar British law for more than 20 years has shown that it is practically impossible to prove that the manufacturer violating the statute did so "knowingly." The New York law which has just been placed upon the statute books, and takes effect October 1 next, is copied from the pioneer law of the kind in this country, the Massachusetts statute, which was only enacted and approved in 1911. Although, as stated, these laws in their present form are obviously dead letters, their enactment has at least placed two great States on record as approving of the principle involved, and thus has paved the way for effective legislation on these lines sooner or later.

THE PRESENT STATUS OF THE WORLD-WIDE EFFORT TO DIMINISH INFANT
MORTALITY AND ITS POSSIBILITIES

To summarize, in closing, the contents of this paper, it would seem to be apparent that the more or less nationalized, systematized, world-wide effort to diminish infant mortality practically does not antedate the last decade. In fact, though isolated, spasmodic, individual efforts on these lines may perhaps be traced back even to the eighteenth century, it was not until national organizations and international organizations with this end in view began to be formed that the movement could properly be termed an unified, world-wide, effort.

An accurate statistical summary of the results of the effort to date would be a physical impossibility, owing to the fact that no system of recording these results, even in individual cases, has as yet been devised which would furnish a basis for such a statistical summary on broad lines. Perhaps the difficulties of systematizing such an effort could not be better summarized than by quoting the following editorial from the issue for April, 1907 (Vol. XIX, No. 7), of "Public Health—the Journal of the Incorporated Society of Medical Officers of Health," of Great Britain, on the subject of "Statistical measurement of means employed to decrease infant mortality:—"

It may be taken as evidence of a scientific spirit that we are anxious to proceed from the qualitative to the quantitative, and to measure the efficiency of measures recommended by us in the public interest by statistical results. Such measures may or may not be sufficiently accurate for the purpose for which they are utilized. They may furthermore, although accurate in themselves, not be able to allow for factors of variation of greater magnitude than the one which is being measured. There can be no better illustration of this than the question of municipal milk depots.

The infant mortality of an urban community which has had a milk depot for a number of years is found to have declined. How much of this is due to cool summers, and how much to the operations of the depot? Before one can begin to make the necessary comparisons on these lines it is first necessary to ascertain the magnitude of the operations of the depot. If in a community having 5,000 births annually, 500 have been fed from the depot; if these 500 have been each fed for a whole year on the depot milk, and if this feeding has been so successful that not a single baby has died from the results of bad feeding which might otherwise have accrued; and if it be assumed, contrary to the facts, that the sole cause of infant mortality is bad feeding, then the infantile mortality may, under these circumstances, have declined 10 per cent, say from 150 to 135 per 1,000 births. A greater effect could only be produced if the babies fed at the

depot were specially selected. The illustration suffices to show that we have to deal with small differences, in which the factors of variation, other than depot or nondepot feeding can not be eliminated.

Even greater difficulties arise when the attempt is made to state the special mortality of the depot-fed babies in terms of the total numbers of depot-fed babies. A death rate must embrace the experience of a whole year, or correct for a more limited period. It must comprise babies of a similar age-distribution in the depot and the nondepot-fed groups; or it must make a correction for differences in this respect. If these corrections are not made the statistics are useless; and, so far, we have never seen them made with any completeness, and doubt if the conditions of work in these depots enable it to be done.

Although these considerations raise doubt as to the validity of comparisons between depot-fed babies and babies not thus fed in the same community, and, still more, between towns in which there are and are not milk depots, they do not effect the main question as to the utility of a pure milk supply for babies. The question is one that must be decided on general principles. Pure milk, whether obtained from municipal depots or elsewhere, is an essential condition of healthy infant life; and all efforts in this direction are of value, not only because of their immediate effect on infant mortality, but also because of their wider educational effect.

Of course, as the British journal argued, it would be contrary to the known facts in the case to contend that "the sole cause of infant mortality is bad feeding," and hence by no means the entire decrease in the infant mortality rate of a town well supplied with milk stations could properly be credited to that one agency. The zone of operations and influence of milk stations, and all the other agencies for the reduction of infant mortality, in any large city at best must be more or less limited, and not only are numerous other factors constantly at work, for better or for worse, in determining the current infant mortality of the city, but at most the agencies for its reduction can play but a comparatively small part at any given time in fixing the figure for the entire community. It would be as absurd to give these agencies the credit for all the reduction in infant mortality which the vital statistics of the city might chance to show in any particular year as it would be to charge those agencies with the entire possible increase in the next year's infant mortality.

According to the returns presented by the Babies' Welfare Association for New York City, up to September 14 last, there had been 571 less deaths under 1 year, from all causes, in New York than in the corresponding period of the previous year, and at this rate the total reduction for the entire city for the entire current year would be 810

infant deaths, or a decrease of only 5.4 per cent from the total infant mortality of 15,017 in 1911. Assuming that this ratio should approximately hold good of the decrease in the infant mortality rate for 1912, the infant death rate of 111.6 for New York City in 1911 would drop only to 105.6, and if that slight decrease were the real measure of the service rendered by all four score or so milk stations in New York, with its great population of approximately 5,000,000, the working efficiency of this means of reducing infant mortality would seem almost negligible.

This specific illustration demonstrates the impossibility of attempting to trace the results of any given means of reducing infant mortality by the crude figures of the entire community's decrease. Not even the merest approximation of the effects of the agencies in question could be statistically calculated without taking all the principal known factors in infant mortality into account, properly weighing each of them for its relative importance, and then reducing the experience of the agencies under investigation and that of the infant population without its zone of influence to a common basis. And, even then, the most carefully computed conclusions would be open to serious question.

In Germany, in the third quarter of 1911, the infant mortality was higher by 30,000, in consequence of the unusual summer heat, than the experience of previous years would have predicated, and an official bulletin (No. 1323) issued by the minister of the interior under date of May 25, 1912, so records. Presumably the total infant mortality for 1911 must have shown a pronounced increase over that of 1910, and on the mere face of the vital statistics of Germany for the two years in question it would appear that there was an alarming upward shoot to Germany's infant mortality curve in 1911, despite its remarkable, nation-wide, campaign for the reduction of infant mortality, which had been more systematically and more vigorously pushed in that year than ever before. Manifestly, this supposed increase in the number of infant deaths in no way detracted from the beneficial results of the campaign, but for which the increase undoubtedly would have been much larger; but the case in point really emphasizes with exceptional force the difficulties—if not sheer impossibility—of recording in specific figures the actual saving of infant life effected up to date by the world-wide effort to diminish infant mortality.

That the effort in question, as yet scarcely launched, has been directly responsible for saving many thousands of babies who otherwise would have died, there can be no question. But neither the effort itself, nor the methods of recording its results, can as yet be regarded as sufficiently advanced to warrant sound statistical conclusions. In my judgment, up to date demography is practically powerless to reduce to figures the results of the effort to diminish infant mortality. That there has been a pronounced decrease in the number and rate of infant deaths in the last few years in the European countries which have seriously grappled with the problem, is an incontrovertible fact, and is demonstrated by the tabulations appended to this paper. As Dr. Stevenson, of the British registrar-general's office, said in his annual report for 1909, "it is impossible to avoid associating this decline with the simultaneous increase of effort to reduce infant mortality." But, just how much of the decrease is directly due to the effort to reduce infant mortality, and how much to entirely independent causes, meteorological and otherwise, no one can undertake to say with the slightest semblance of authority. As yet, that particular problem of vital statistics would seem to be without the confines of statistical investigation.

In so far as even a semblance of a statistical summary of the result of the effort to diminish infant mortality may be offered, I am inclined to believe that the appended tabulation of the number of infant deaths and the infant death rate in each of 68 European cities for each year of the decade ending with 1909, and the analysis of these figures and their decrease or increase by the two five-year periods involved, offer reasonably strong circumstantial evidence—though by no means mathematical proof—of the results, or at least the tendency, of the effort in question. In brief, the tabulation in question shows that in the five-year period, 1905-1909, there was a more or less pronounced decrease in both the aggregate number of infant deaths and in the average infant death rate in the case of each of the national groups of cities therein presented, as compared with the returns for the five-year period immediately preceding. As the tabulation shows, in every one of the 30 leading German cities involved there was an actual, and in almost every case material, decrease in the infant death rate, and in all of those cities, with very few exceptions, there was a substantial decrease in the number of infant deaths, although, as shown by the tabulation, the populations of those cities had materially increased

during the decade. In the case of the groups of cities in both France and Great Britain the results were similar, though less pronounced than in the case of the German cities, and in Italy, Belgium, Austria-Hungary, the Netherlands, and even Russia there were decreases in the infant mortality rate in the later five-year period, and in most cases decreases in the number of infant deaths.

It would be an entirely unwarranted conclusion, nevertheless, to assume that all of the decreases shown were direct results of the campaign against infant mortality. The world's general death rate has been decreasing with substantial uniformity in the case of civilized countries for many years, and especially for the last decade, and it would be natural to assume that the general improvement in medical knowledge and science, sanitation, and hygiene would operate to produce at least some decline in infant mortality rates as well as in the general death rate. Furthermore, the birth rates of practically all civilized countries, and especially in cities, have had a pronounced downward trend in the last 10 years, and while in most cases the downward move in birth rates was not sufficiently pronounced to offset the increases in population and thus decrease the actual number of births, nevertheless the decline in the birth rates would of course tend to decrease to a certain extent the number of births despite the increases in population. For these reasons, even the most sanguine worker for the reduction of infant mortality could not for a moment claim that all of the decrease which might be shown by five-year comparisons was due to the crusade against preventable infant mortality.

However, a comparison of the decreases in infant mortality and in the general death rates in the five-year periods in question will show that the decrease in the former case was generally much more pronounced than in the latter, and I venture to conclude that the general decrease in infant mortality rates, especially in the European cities in which a vigorous campaign has been conducted, at least affords indirect statistical evidence of the productive effect of the work on these lines.

The evidence, if "evidence" it may properly be termed, is much more convincing on account of the five-year scope of the comparison than would be similar data for any individual years, but at best could scarcely be regarded as statistical proof—let alone legal proof—of how much effect the movement has actually had up to date.

In the light of the most authoritative, up-to-date evidence furnished by the statistical bureaus of the various countries in response to the inquiry for this paper, I can personally regard the world-wide effort to diminish infant mortality as now only in its incipency. A few countries, especially Germany, have advanced much further than others in systematizing and nationalizing their efforts, and the interchange of ideas, and plans, and experiences strongly tends to crystalize the movement throughout the civilized world on at least certain proven fundamental lines. In course of time, possibly in the not-far-distant future, there will be a definite international agreement on these fundamental points, and, unless I am seriously in error in my conclusions, the advanced nations will soon come to realize that lasting, permanent, results can only be secured by means of a wholesale education of the coming generation of mothers to the prime requisites of successful motherhood.

England is already partially committed to the necessity of making this subject part of the curriculum of its elementary schools, Germany is discussing the possibilities of similar action, and all authorities who have deeply studied the problem are substantially agreed that broader results may be secured with the mothers who are to be than with those whose minds and habits are already more or less fixed. With the latter class, the instructions and advice passed to them at the milk stations, consultations, schools for mothers, etc., doubtless will have some effect, and probably be the means of saving many thousands of infant lives. But, if certain fundamentals as to the great importance of breast feeding, cleanliness, and rational care of the baby can be effectively brought before the next generation of mothers in their early, plastic, years of school life—by means of exhibitions, moving pictures, prize offerings, or any other methods of really appealing to the mind of the growing girl—then, and perhaps not until then, the civilized world at large will unquestionably witness a real, widespread, and lasting reduction in its infant mortality.

A tabular study of the annual number and ratios per 1,000 living births in the preceding year of the deaths under 1 year in 68 leading European cities for the decade, 1900-1909, inclusive, and an analysis of the total numbers and average ratios and their decrease or increase by the quinquennial periods, 1900-1904, and 1905-1909.

[Compiled on the basis of the returns presented in the "Statistique démographique des grandes villes du monde, publiée à l'occasion de la XIII Session de l'Institut International de Statistique à la Haye, septembre, 1911," by the bureau municipal de statistique d'Amsterdam.]

Cities	Number of deaths under 1 year, and rates per 1,000 living births in the preceding year											
	1900		1901		1902		1903		1904		1905	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
GERMANY												
Aachen	135,245	156,044	227	1,002	904	192	829	185	896	207	924	208
Barmen	140,983	169,201	170	707	586	122	616	137	631	141	141	141
Berlin	1,888,848	2,070,895	11,762	239	8,928	177	9,457	191	9,733	203	19,170	208
Bochum	101,957	136,316	324	514	476	168	405	144	835	166	161	149
Bremen	163,297	246,827	866	191	859	170	974	163	1,070	176	1,110	176
Breslau	422,769	511,891	3,911	739	3,103	220	3,536	243	3,353	249	3,616	252
Cassel	106,034	153,078	523	172	394	130	435	143	502	164	430	140
Charlottenburg	186,365	305,181	883	186	661	140	845	187	807	172	778	165
Chemnitz	206,913	287,340	2,742	349	2,198	275	2,214	286	2,509	330	2,344	287
Cologne	372,829	516,167	3,554	257	3,110	212	2,983	204	3,434	235	3,264	216
Crefeld	106,893	129,412	653	213	442	143	399	133	462	161	384	139
Danzig	140,563	170,347	1,530	324	1,103	216	1,282	243	1,145	218	1,288	247
Dortmund	142,733	214,333	1,186	195	1,000	159	1,091	169	1,224	181	1,280	182
Dresden	396,146	546,882	2,658	201	2,962	161	2,962	189	3,215	209	3,036	200
Düsseldorf	213,711	357,702	1,612	200	1,462	176	1,557	188	1,736	209	1,658	194
Elberfeld	157,927	170,118	930	182	844	156	871	175	816	162	799	155
Essen	118,862	294,629	977	198	1,442	140	1,377	167	1,325	166	1,389	172
Frankfurt on the Main	288,989	414,998	1,523	206	1,225	144	1,453	170	1,459	170	1,577	172
Hamburg	705,738	932,166	3,742	180	3,023	151	3,459	174	3,321	171	3,542	178
Hanover	235,649	302,844	1,437	193	1,023	145	1,014	154	1,098	175	988	154
Königsberg	189,483	245,853	1,678	296	1,464	169	1,306	223	1,156	208	1,414	243
Krefeld	456,124	587,635	3,855	252	3,599	232	3,562	229	3,577	245	3,355	238
Leipzig	229,667	279,885	1,929	265	1,392	199	1,514	227	1,612	247	1,505	236
Magdeburg	499,959	595,053	5,272	318	4,508	257	4,075	228	3,834	224	3,659	219
Munich	261,081	332,651	2,994	303	2,391	220	2,530	244	2,707	273	2,571	253
Nürnberg	173,888	191,104	1,684	268	1,346	196	1,750	246	1,802	257	1,797	213
Plauen	156,696	194,494	1,043	271	820	114	1,040	233	1,131	243	1,298	260
Posen	171,033	236,149	6343	2,754	1,886	231	2,160	275	1,984	263	1,887	252
Stettin	210,702	286,145	2,636	354	1,903	212	1,053	225	1,966	212	1,901	210
Strassburg	151,913	186,913	1,090	242	1,003	212	1,053	225	1,066	196	1,413	253
Stuttgart	176,639	286,569	1,175	231	1,146	208	1,108	201	1,076	196	1,413	253
Totals and average rates. . . .	8,600,708	11,105,235	65,464	240	52,032	182	56,852	201	58,279	207	58,910	203

a Ratio to living births in same year.

Rome	482,783	538,634	1,394	120	1,330	115	1,519	132	1,746	145	1,744	144	1,848	152
Turin	335,656	427,733	1,217	164	1,098	154	1,058	146	1,094	144	1,047	151	912	127
Totals and average rates....	2,240,158	2,733,491	8,575	161	8,997	164	8,383	146	8,561	147	8,598	146	8,719	147
BELGIUM														
Antwerp	272,831	320,640	1,497	189	1,389	173	1,250	161	1,273	164	1,297	180	1,220	167
Brussels	538,012	685,806	1,942	197	1,861	187	1,731	158	1,761	174	1,602	154	1,645	168
Ghent	180,133	165,149	1,101	263	1,169	242	1,005	228	1,060	249	1,107	273	858	218
Liege	137,760	174,768	502	138	506	140	421	115	501	144	418	121	407	129
Totals and average rates....	1,148,736	1,326,363	4,102	197	3,925	186	3,407	166	3,595	183	3,424	182	3,128	171
THE NETHERLANDS														
Amsterdam	510,856	572,983	2,124	137	2,108	141	1,998	123	1,776	117	1,827	120	1,620	109
Rotterdam	318,507	426,888	1,941	171	2,134	177	1,662	135	1,830	148	1,644	135	1,606	125
Utrecht	102,086	120,208	510	152	556	168	505	148	457	129	532	154	471	134
Totals and average rates....	931,449	1,121,079	4,575	153	4,798	162	4,165	135	4,063	131	4,003	136	3,697	123
AUSTRIA-HUNGARY														
Budapest	734,165	880,371	3,825	166	3,358	143	3,439	151	3,128	136	3,218	147	3,434	156
Lemberg	159,877	206,113	1,118	186	1,071	183	970	160	897	147	887	152	1,158	195
Vienna	1,674,957	2,031,498	10,084	194	8,975	171	9,635	184	8,850	168	8,934	176	9,685	188
Totals and average rates....	2,568,999	3,117,982	15,027	182	13,404	166	14,044	165	12,875	150	13,039	158	14,277	180
RUSSIA														
Moscow	988,614	1,481,200	13,505	387	13,146	370	12,472	344	12,924	343	12,961	338	12,963	325
St. Petersburg	1,132,677	1,907,708	9,529	269	9,198	251	9,027	243	9,905	250	9,981	251	10,711	260
Warsaw	638,208	781,179	4,409	185	4,513	186	3,781	144	4,522	175	4,464	177	3,919	138
Totals and average rates....	2,759,499	3,170,087	27,533	280	26,357	269	25,280	244	27,351	256	27,406	255	27,593	241

Populations given are those for the registration city in 1901 and 1911.

A tabular study of the annual number and ratios per 1,000 living births in the preceding year of the deaths under 1 year in 68 leading European cities for the decade, 1900-1909, inclusive, and an analysis of the total numbers and average ratios and their decrease or increase by the quinquennial periods, 1900-1904, and 1905-1909—Continued.

Number of deaths under 1 year, and rates per 1,000 living births in the preceding year																				
Cities	1906				1907				1908				1909		First half of decade, 1900-1909		Second half of decade, 1900-1909		Decrease or increase in second half	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Total Number	Aver- age Rate	Total Number	Aver- age Rate	Decrease		Increase			
															Number	Rate				
GERMANY																				
Aachen	916	214	853	187	722	167	750	172	4,681	206	4,165	190	516	16	.....	.....				
Barmen	548	117	481	105	435	94	403	92	3,338	144	2,539	110	799	34	.....	.....				
Berlin	9,111	184	8,295	161	8,250	162	7,178	146	51,250	208	43,004	172	8,246	36	.....	.....				
Bochum	847	167	842	158	979	167	773	127	2,763	173	4,262	154	.....	19	1,438	.....				
Bremen	1,065	171	981	148	969	143	807	118	4,568	174	4,932	151	.....	23	364	.....				
Breslau	3,132	218	3,294	224	2,871	203	3,068	207	18,001	257	15,981	221	2,020	36	.....	.....				
Cassel	515	161	455	112	436	113	437	106	2,346	154	2,293	126	53	28	.....	.....				
Charlottenburg	768	154	696	128	716	129	690	123	4,052	173	3,648	140	404	33	.....	.....				
Chemnitz	2,157	263	2,055	243	2,081	241	1,742	197	12,521	328	10,379	246	2,142	82	.....	.....				
Cologne	3,434	226	3,023	195	3,031	191	2,550	163	16,731	233	15,302	198	1,429	35	.....	.....				
Crefeld	435	159	388	143	451	167	418	132	2,505	167	2,076	148	429	19	.....	.....				
Danzig	1,095	210	1,022	190	1,073	214	1,060	201	6,419	257	5,538	212	881	45	.....	.....				
Dortmund	1,460	193	1,364	174	1,390	172	1,242	161	5,695	179	6,736	176	1,800	37	1,041	.....				
Dresden	2,396	166	2,085	146	2,030	148	1,770	133	13,117	196	11,317	159	637	25	.....	.....				
Düsseldorf	1,695	195	1,282	148	1,356	155	1,449	167	8,077	197	7,440	172	1,355	49	.....	.....				
Elberfeld	628	126	558	112	551	112	459	97	4,350	169	2,995	120	1,355	49	.....	.....				
Essen	1,657	179	1,295	138	1,399	150	1,202	128	6,328	168	6,942	153	945	27	.....	.....				
Frankfurt on the Main	1,415	155	1,278	131	1,327	139	1,144	120	6,986	170	6,741	143	1,577	17	.....	.....				
Hamburg	3,509	172	2,950	135	3,458	163	3,067	138	17,525	214	16,536	157	999	17	.....	.....				
Hanover	957	160	931	157	890	147	872	126	6,000	173	4,638	149	1,362	24	.....	.....				
Königsberg	1,293	226	1,660	244	1,289	193	1,206	173	6,604	229	6,862	216	1,362	24	.....	.....				
Leipzig	2,831	193	2,473	168	2,457	174	2,335	169	17,407	230	13,451	186	3,956	44	258	.....				
Magdeburg	1,412	220	1,406	214	1,362	210	1,138	179	8,149	235	6,823	214	1,926	21	.....	.....				
Munich	3,095	191	3,057	193	2,906	194	2,757	183	21,981	252	15,474	196	6,507	56	.....	.....				
Nürnberg	2,362	233	2,141	207	2,091	204	1,854	185	12,123	255	11,019	216	2,104	41	.....	.....				
Pleasen	843	216	769	197	778	206	642	162	5,534	240	3,849	199	.....	39	295	.....				
Posen	1,013	203	1,020	192	1,067	207	1,051	197	5,191	249	5,449	230	.....	37	258	.....				
Stettin	1,718	240	1,474	207	1,642	242	1,319	209	11,400	293	8,040	230	3,360	63	.....	.....				
Strasbourg	909	193	796	168	786	171	765	164	5,066	221	4,257	181	809	40	.....	.....				

Stuttgart	1,330	188	1,121	157	1,232	173	1,077	147	5,587	210	6,173	184	.....	26	586	.....
Totals and average rates	54,546	190	50,045	169	50,045	172	45,225	154	295,296	210	258,771	177	41,379	33	4,854	.....
FRANCE																
Bordeaux	411	93	519	119	432	101	490	115	2,943	117	2,322	106	621	11	.....	.....
Le Havre	686	191	617	173	548	150	521	150	3,679	186	3,023	188	.....	18	.....	.....
Lille	1,062	213	1,047	193	995	193	924	178	6,611	216	5,303	198	1,308	18	.....	.....
Lyon	1,074	197	949	115	908	114	754	189	5,488	127	4,631	112	857	15	.....	.....
Nancy	1,261	168	1,031	138	908	187	754	177	5,894	163	2,011	164	.....	.....	117	.....
Paris	5,542	108	5,326	104	454	104	4,721	94	30,870	111	26,470	103	4,400	8	.....	.....
St. Etienne	358	124	327	113	333	115	289	94	1,903	119	1,672	113	231	6	.....	.....
Totals and average rates	9,624	146	9,135	136	8,884	138	8,142	128	53,388	148	45,432	138	8,073	10	117	.....
GREAT BRITAIN																
Belfast	1,635	143	1,523	133	1,692	150	1,510	134	8,350	149	7,910	139	440	10	.....	.....
Birmingham	2,686	170	2,300	144	2,339	150	2,030	126	15,167	178	11,806	147	3,361	31	.....	.....
Bradford	1,903	149	1,713	120	860	150	645	107	4,953	156	3,992	133	961	23	.....	.....
Bristol	1,196	123	900	96	1,102	123	860	98	5,866	128	5,240	114	626	14	.....	.....
Derby	354	114	377	122	359	114	391	118	2,254	147	1,948	122	306	25	.....	.....
Dublin	1,628	146	1,714	154	1,683	154	1,605	140	8,829	166	8,232	147	597	19	.....	.....
Edinburgh	899	116	946	124	913	122	880	117	5,257	130	4,668	122	589	8	.....	.....
Glasgow	3,223	133	3,116	127	3,284	137	3,073	128	17,752	145	15,890	131	1,892	14	.....	.....
Hull	1,254	163	968	124	1,215	158	916	112	6,611	168	5,537	142	1,074	26	.....	.....
Liverpool	4,137	170	3,883	140	3,355	142	3,377	141	20,698	179	17,962	149	2,736	30	.....	.....
London	16,307	131	14,114	116	13,943	113	12,582	102	94,198	144	73,270	118	20,928	26	.....	.....
Portsmouth	1,701	135	1,714	122	607	105	556	91	3,840	148	3,333	118	507	30	.....	.....
Totals and average rates	34,923	141	30,768	127	31,352	135	28,423	118	193,805	153	159,788	132	34,017	21	.....	.....
ITALY																
Bologna	445	144	404	126	453	139	427	128	2,612	164	2,469	135	443	29	.....	.....
Genoa	863	148	1,026	165	935	153	1,026	168	4,681	165	4,825	159	.....	6	144	.....
Milan	1,887	140	1,896	138	1,786	125	1,931	124	9,670	151	9,446	134	224	17	.....	.....
Naples	2,575	155	2,484	145	2,601	156	2,532	142	12,944	154	12,790	151	154	3	.....	.....
Rome	1,835	151	1,670	133	1,679	131	1,831	134	7,733	131	8,863	140	.....	.....	1,130	.....
Turin	989	144	1,039	146	1,043	142	948	122	5,474	152	4,931	136	543	16	.....	.....
Totals and average rates	8,504	147	8,519	142	8,497	141	8,695	136	43,114	153	43,024	143	1,364	10	1,274	.....
BELGIUM																
Antwerp	1,205	182	1,144	167	1,177	166	1,060	157	6,706	175	5,906	168	800	7	.....	.....
Brussels	711	193	616	169	711	203	640	197	3,887	174	3,323	186	574	.....	.....	12
Ghent	929	246	759	208	895	234	589	170	3,502	251	4,028	219	1,474	32	.....	.....
Liege	492	157	388	124	420	141	348	122	2,348	132	2,055	135	293	.....	.....	3
Totals and average rates	3,437	195	2,907	167	3,203	191	2,637	162	18,453	183	15,312	177	3,141	6	.....	15

a Ratio to living births in same year.

RECAPITULATION

National groups of cities	Number of deaths under 1 year, and rates per 1,000 living births in the preceding year														
	Populations at beginning and end of decade, 1900-1910			1900		1901		1902		1903		1904		1905	
	1900	1910		Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
30 cities of the German Empire...	8,600,708	11,105,235		65,464	240	62,669	221	52,032	182	56,852	201	58,279	207	58,910	203
7 cities of France...	4,019,815	4,296,155		11,687	163	10,989	150	10,743	146	9,716	136	10,253	146	9,647	140
12 cities of Great Britain...	8,685,364	8,966,965		41,481	162	30,812	160	37,148	147	35,525	139	39,839	158	34,322	139
6 cities of Italy...	2,240,158	2,733,491		8,575	161	8,997	164	8,383	146	8,561	147	8,598	146	8,719	147
4 cities of Belgium...	1,148,736	1,326,363		4,102	197	3,925	186	3,407	166	3,595	183	3,424	182	3,128	171
3 cities of the Netherlands...	931,449	1,121,079		4,575	153	4,798	162	4,165	135	4,063	131	4,003	136	3,697	123
3 cities of Austria-Hungary...	2,568,999	3,117,982		15,027	182	13,404	166	14,044	165	12,875	150	13,039	158	14,277	180
3 cities of Russia...	2,759,499	3,170,087		27,533	280	26,857	269	25,280	244	27,351	256	27,406	255	27,593	241
Grand totals for 68 leading cities of Europe.....	30,954,728	35,837,357		178,444	192	171,451	185	155,202	166	158,538	168	164,841	174	160,293	168

National groups of cities	Number of deaths under 1 year, and rates per 1,000 living births in the preceding year—continued															Decrease or increase in latter period
	1906			1907		1908		1909		Number		Average Rates		Decrease or increase in latter period		
	Number	Rate		Number	Rate	Number	Rate	Number	Rate	1900-4	1905-9	1900-4	1905-9	Number	Rate	
30 cities of the German Empire...	54,546	190		50,045	169	50,045	172	45,225	154	295,296	258,771	210	177	36,525	33	
7 cities of France...	9,624	146		9,135	136	8,854	138	8,142	128	53,388	45,432	148	138	7,956	10	
12 cities of Great Britain...	34,923	141		30,768	127	31,352	135	28,423	118	193,805	159,788	153	132	34,017	21	
6 cities of Italy...	8,594	147		8,519	142	8,497	141	8,695	136	43,114	43,024	153	143	90	10	
4 cities of Belgium...	3,437	195		2,907	167	3,203	191	2,637	162	18,453	15,312	183	177	3,141	6	
3 cities of the Netherlands...	3,555	117		3,093	100	3,153	105	2,581	88	21,604	16,009	144	107	5,595	37	
3 cities of Austria-Hungary...	12,634	153		12,505	154	12,745	159	12,310	163	68,389	64,471	165	162	3,918	3	
3 cities of Russia...	29,547	265		31,012	260	32,666	264	31,833	253	134,427	152,651	261	257	618,224	64	
Grand totals for 68 leading cities of Europe.....	156,860	169		147,914	157	150,545	163	139,846	150	828,476	755,458	177	162	673,018	615	

a Net decrease.

b Net increase.

a Net decrease.

b Net increase.

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